Installation Manual

Simrad ES38-7

Split-beam transducer



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Simrad ES38-7
Split-beam transducer
Installation Manual

The purpose of this manual is to provide the information, procedures and basic drawings required for the physical installation of the Simrad ES38-7. The manual further provides relevant descriptions and illustrations to explain the basic principles for location and noise considerations.

Note

The installation shipyard must provide all necessary installation drawings. If required, all documents provided by the shipyard for the physical installation of the ES38-7 must be approved by the vessel's national registry and corresponding maritime authority and/or classification society. The shipowner and shipyard doing the installation are responsible for obtaining and paying for such approval.

404292/D
June 2019 © Kongsberg Maritime AS

Document information

- **Product**: Simrad ES38-7
- **Document**: Installation Manual
- **Document part number**: 404292
- **Revision**: D
- **Date of issue**: 4 June 2019

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Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. You must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.

Kongsberg Maritime disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Disclaimer

Kongsberg Maritime AS endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Support information

If you require maintenance or repair, contact your local dealer. You can also contact us using the following address: simrad.support@simrad.com. If you need information about our other products, visit https://www.simrad.com. On this website you will also find a list of our dealers and distributors.

Kongsberg Maritime AS
www.kongsberg.com

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About this manual

The purpose of this manual is to present the descriptions and drawings required to install the Simrad ES38-7 Split-beam transducer.

Target audience

The manual is intended for technical personnel; such as skilled shipyard workers, electricians, qualified engineers and naval architects. It is assumed that you understand the general principles of maritime electronic equipment. You must also be familiar with the installation of electronic and mechanical products. You are expected to have basic mechanical skills and familiarity with handling of sensitive electronic equipment.

Installation instructions and drawings

The information in this document must be regarded as general guidelines and recommendations only. The installation shipyard must design and manufacture installation hardware to fit each individual transducer on the vessel.

Note

The installation shipyard must provide all necessary design and installation drawings, as well as the relevant work standards and mounting procedures.

If required, all documents provided by the shipyard for the physical installation of the ES38-7 must be approved by the vessel's national registry and corresponding maritime authority and/or classification society. Such approval must be obtained before the installation can begin. The shipowner and shipyard doing the installation are responsible for obtaining and paying for such approval.

Kongsberg Maritime AS will accept no responsibility for any damage or injury to the system, vessel or personnel caused by equipment that has been incorrectly installed or maintained, or by drawings, instructions or procedures that have not been prepared by us. The outline dimensions of the ES38-7 transducer and the relevant installation items can be found in the *Drawing file* chapter in this manual.

End user manuals and source drawings (normally in AutoCad format) can be downloaded from our website.

- https://www.simrad.com

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Simrad ES38-7

The Simrad ES38-7 is a wide band split beam transducer designed for fishery and underwater science applications. The beamwidth is 7 degrees at nominal operational frequency 38 kHz. The ES38-7 is designed with four separate sectors, and includes a sensor to measure the sea temperature.

To read the temperature, the relevant hardware and software resources must be available in the echo sounder system.



The transducer is normally mounted flush with the hull plating or the bottom of a blister. It is provided with an installation flange, and by means of a clamping ring it is secured to a mounting ring welded into the hull plating or the bottom of a blister. The clamping ring is provided with the transducer, and already fitted.

The transducer can also be flush mounted at the bottom of a drop keel.

The transducer cable penetrates the hull using a cable gland which consists of bushing, washer, rubber gasket and packing nipple.

Note

The ES38-7 is often used as a replacement for the discontinued ES38B. If you do that, make sure that the horizontal support bar used on the ES38B is removed before you mount the ES38-7.

Topics

Order information, page 8

Physical and environmental specifications, page 9

Support information, page 10

Order information

To order the ES38-7, or any of the optional items provided with it, contact your local dealer. If you do not have a regular dealer, a list of all our distributors and dealers can be found on our website. Your dealer will also be able to help you with a detailed quotation including price and delivery information.

Transducer

Item	Part number	In the box
Transducer	321842	ES38-7 Transducer Bushing Mounting hardware

The ES38-7 is provided with a dedicated clamping ring that is already fitted to the transducer flange. Relevant documents and drawings (normally in PDF and/or AutoCad format) can be downloaded from our website.

- https://www.simrad.com/td

Optional items

These optional items are available for the installation. The items can be manufactured locally, or ordered from Kongsberg Maritime. The items are not included with the ES38-7 delivery, and must be ordered separately. The order number for the cable is included in case the original cable fitted to the transducer is too short.

Optional items	Part number	In the box
Mounting ring	499-074076	
Transducer cable	382189	

Related topics

Simrad ES38-7, page 7
074076 Mounting ring ES38-7, page 80

Physical and environmental specifications

These physical and environmental specifications are important for handling, storage and installation.

Note

At Kongsberg Maritime, we are continuously working to improve the quality and performance of our products. The technical specifications may be changed without prior notice.

Weight and outline dimensions

- **Physical dimensions**
  - **Diameter**: 478 mm
  - **Height**: 145 mm (Body)
  - **Total height**: 191 mm
- **Weight**
  - **In air**: 68 kg (With cable)
  - **In water**: 45 kg (Without cable)
- **Cable length**: 20 m
- **Bending radius**
  - **Static**: 100 mm (Theoretical)
  - **Dynamic**: 185 mm (Theoretical)

Environmental requirements

- **Storage temperature**
  - **Maximum**: +60° C
  - **Minimum**: -20° C
- **Operational temperature**
  - **Maximum**: +40° C
  - **Minimum**: -5° C

Related topics

Simrad ES38-7, page 7
393820 Dimensions ES38-7, page 74
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Support information

If you need technical support for your Simrad ES38-7 you must contact your local dealer, or one of our support departments. A list of all our offices and dealers is provided on our website. You can also contact our main support office in Norway.

Norway (main office)

- **Company name**: Kongsberg Maritime AS / Simrad
- **Address**: Strandpromenaden 50, N-3190 Horten, Norway
- **Telephone**: +47 33 03 40 00
- **Telefax**: +47 33 04 29 87
- **Website**: https://www.simrad.no
- **E-mail address**: simrad.support@simrad.com

Spain

- **Company name**: Simrad Spain S.L.U
- **Address**: Partida Atalayes 20, 03570 Villajoyosa, Spain
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- **Telefax**: +34 966 852 304
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- **E-mail address**: simrad.spain@simrad.com

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- **Telephone**: +33 298 582 388
- **Telefax**: +33 298 582 388
- **Website**: http://www.simrad.fr
- **E-mail address**: simrad.france@simrad.com

USA

- **Company name**: Kongsberg Underwater Technology Inc / Simrad Fisheries
- **Address**: 19210 33rd Ave W, Suite B, Lynnwood, WA 98036, USA
- **Telephone**: +1 425 712 1136
- **Telefax**: +1 425 712 1193
- **Website**: https://www.simrad.com
- **E-mail address**: fish.usa.support@simrad.com

Canada

- **Company name**: Kongsberg Mesotech Ltd.
- **Address**: 1598 Kebet Way, Port Coquitlam, BC, V3C 5M5, Canada
- **Telephone**: +1 604 464 8144
- **Telefax**: +1 604 941 5423
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Malaysia

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China

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- **Telephone**: +86-21-3127-9888
- **Telefax**: +86-21-3127-9555
- **Website**: https://www.simrad.com
- **E-mail address**: simrad.china@simrad.com

Related topics

Simrad ES38-7, page 7

Transducer handling and maintenance

Topics

Rules for transducer handling, page 14

Approved anti-fouling paints, page 15

Inspecting and cleaning the transducer face, page 17

Painting the transducer face, page 19

Rules for transducer handling

To secure long life and accurate results, the transducer must be handled correctly.

A transducer must always be handled as a delicate instrument. Incorrect actions may damage the transducer beyond repair. Observe these transducer handling rules:

1 **Do not** activate the transducer when it is out of the water.

2 **Do not** handle the transducer roughly and avoid impacts.

3 **Do not** expose the transducer to direct sunlight or excessive heat.

4 **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.

5 **Do not** damage the outer protective skin of the transducer face.

6 **Do not** lift the transducer by the cable.

7 **Do not** step on the transducer cable.

8 **Do not** damage the transducer cable, and avoid exposure to sharp objects.

Transport protection

Some transducers are delivered with a cover plate to protect the face during transport and installation. Let this plate stay on as long as possible, but do not forget to remove it before the vessel goes to sea.

Cleaning and painting the transducer face

During normal use, the transducer is subjected to biological fouling. If this marine growth is excessive, it will reduce the performance of the ES38-7.

The transducer has not been designed with any protection against biological fouling. Whenever opportunity arise, typically when the vessel is dry-docked, the transducer face must be cleaned for shells and other marine growth.

- Be careful so that you do not accidentally make cuts or inflict other physical damage to the transducer face.
- Remove biological fouling carefully using a plastic brush, a suitable synthetic detergent and fresh water. Biological material which is strongly rooted in the substrate can be removed carefully with a piece of wood or plastic.
- **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer.

Anti-fouling paint may be applied to the transducer face. To minimize the negative acoustical effects the layer of anti-fouling paint must be as thin as possible.

Note

The anti-fouling paint will reduce the acoustical performance of the transducer. The surface roughness of the transducer substrate and the thickness of the paint may also influence the performance. Kongsberg Maritime cannot be held responsible for any negative consequences of the anti-fouling paint.

Because some paint types may be aggressive to the polyurethane in the transducer, consult our list of approved paints. The list can also be found on http://www.simrad.com. Observe the relevant instructions and safety information provided by the paint manufacturer.

Related topics

Transducer handling and maintenance, page 13

Approved anti-fouling paints

This is our list of approved antifouling paints for all transducer types. Always refer to the manufacturer's documentation and data sheets for a complete procedure and for relevant safety information.

Important

Do not paint the transducer with traditional hull plating paint. Use only the correct type of approved paint specified.

Do not use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.

Jotun

- **Manufacturer**: Jotun
- **Address:** P.O.Box 2021, N-3248 Sandefjord, Norway
- **Manufacturer's website**: http://www.jotun.com

Products:

- SeaQuantum Ultra S
  - **Primer**: Safeguard Universal ES

    Apply 80 µm wet film thickness (50 µm dry film thickness).
  - **Paint**: SeaQuantum Ultra S

    Apply 250 µm wet film thickness (125 µm dry film thickness).
- Seaforce 200 AV
  - **Primer**: Safeguard Universal ES AV

    Apply 70 µm wet film thickness (50 µm dry film thickness).
  - **Paint**: Seaforce 200 AV

    Apply 140 µm wet film thickness (90 µm dry film thickness).

Data sheets and application guides can be downloaded from:

http://www.jotun.com/ww/en/b2b/technical-info/tds/index.aspx

International Marine Coatings

- **Manufacturer**: International Marine Coatings
- **Address:** Stoneygate Lane, Felling, Gateshead, Tyne & Wear, NE10 0JY United Kingdom
- **Manufacturer's website**: www.international-marine.com

Products:

- Intersleek 1100SR
  - **Primer**: Intersleek 737

    Apply 50 µm dry film thickness.
  - **Paint**: Intersleek 1100SR

    Apply 150 µm dry film thickness.
- Intersmooth 7465Si SPC
  - **Primer**: Intergard 269

    Apply 40 µm dry film thickness.
  - **Paint**: Intersmooth 7465Si SPC

    Apply 100 µm dry film thickness.

The list can also be found on http://www.simrad.com.

Related topics
Transducer handling and maintenance, page 13
Painting the transducer face, page 19

Inspecting and cleaning the transducer face

Marine growth (biological fouling) on the transducer face reduces the ES38-7 performance. For this reason, it is important to keep the transducer face clean. Every time your vessel is in dry dock, you must remove the marine growth. At the same time, you must inspect the transducer closely for physical damage.

Prerequisites

The following tools and consumables are required.

- Personal protection
- Fresh water
- A mild synthetic detergent and a plastic brush
- A piece of wood or plastic without sharp corners
- Citric acid (<50%) (only if required)

Context

During normal use, the transducer is subjected to biological fouling. If this marine growth is excessive, it will reduce the performance of the ES38-7. Whenever opportunity arise, typically when the vessel is dry-docked, the transducer face must be cleaned for shells and other marine growth.

It is important to check the transducer for physical damage. Any cracks, fractures or holes in the red protective coating may result in a water leak, and a leak may cause irreparable damage to the transducer.

A transducer must always be handled as a delicate instrument. Incorrect actions may damage the transducer beyond repair. Observe these transducer handling rules:

- **Do not** activate the transducer when it is out of the water.
- **Do not** handle the transducer roughly and avoid impacts.
- **Do not** expose the transducer to direct sunlight or excessive heat.
- **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.
- **Do not** damage the outer protective skin of the transducer face.
- **Do not** lift the transducer by the cable.

- **Do not** step on the transducer cable.
- **Do not** damage the transducer cable, and avoid exposure to sharp objects.

Procedure

1 Allow for sufficient access to clean and inspect the entire surface of the transducer.

2 Remove biological fouling carefully using a plastic brush, a suitable synthetic detergent and fresh water.

Biological material which is strongly rooted in the substrate can be removed carefully with a piece of wood or plastic. If required, you can also use citric acid. Apply, leave it working for several hours, and rinse thoroughly with fresh water.

Note

Do not *use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.* ***Do not*** *damage the outer protective skin of the transducer face.*

3 Allow the transducer surface to dry.

4 Do a thorough visual inspection of the transducer. Check for dents, scratches, holes or other damage to the surface.

If you suspect damage, take a high resolution photo. Contact your dealer or the Simrad support organization for advice.

5 If necessary, apply anti-fouling paint as described in the dedicated procedure.

Note

Because some paint types may be aggressive to the polyurethane in the transducer, consult our list of approved paints.

Related topics

Transducer handling and maintenance, page 13
Painting the transducer face, page 19

Painting the transducer face

Marine growth (biological fouling) on the transducer face reduces the ES38-7 performance. We recommend that you paint the transducer face immediately after installation, and then again as often as required to maintain the protection.

Prerequisites

The following tools and consumables are required.

- Personal protection
- Fresh water
- A mild synthetic detergent and a plastic brush
- Fine-grade sandpaper (240 inch grit size)
- Primer
- Anti-fouling paint
- Wet film gauge
- Airless spray

Because some paint types may be aggressive to the polyurethane in the transducer, consult our list of approved paints.

Context

The transducer has not been designed with any protection against biological fouling. Anti-fouling paint may therefore be applied to the transducer face. To minimize the negative acoustical effects the layer of anti-fouling paint must be as thin as possible.

Note

The anti-fouling paint will reduce the acoustical performance of the transducer. The surface roughness of the transducer substrate and the thickness of the paint may also influence the performance. Kongsberg Maritime cannot be held responsible for any negative consequences of the anti-fouling paint.

Observe the relevant instructions and safety information provided by the paint manufacturer.

Procedure

1 Clean the transducer thoroughly.

  Make sure that you remove all oil grease residues, as well as salt and other contamination.

2 Allow the transducer surface to dry.

3 Abrade the transducer surface using a sanding paper with 240 inch grit size.

Do not exceed a surface roughness (R_{max}) of 35 microns as this can influence the ES38-7 performance.

4 Remove all dust.

5 Apply the primer, and let it dry.

6 Apply the paint.

Observe the instructions provided by the paint manufacturer. Use airless spray. Apply the minimum specified film thickness per coat and for the complete layer. It is not possible to measure dry film thickness on transducer surface. You must therefore use a wet film gauge to frequently measure the paint thickness.

Note

We strongly recommend that you do not use a paintbrush and/or a roller.

7 Allow the paint to dry.

Further requirements

The contractor or shipyard must keep a daily paint log recording all relevant information from the surface treatment.

Related topics

Transducer handling and maintenance, page 13
Approved anti-fouling paints, page 15
Inspecting and cleaning the transducer face, page 17
Installing the transducer, page 21

Installing the transducer

Topics

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Designing, manufacturing and mounting the installation hardware, page 24

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Unpacking the transducer from its transport crate, page 29

Installing the transducer cable, page 30

Mounting the transducer, page 33

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Connecting the transducer cable to the transceiver, page 38

Painting the transducer face, page 19

Installation summary

The installation of the ES38-7 transducer is a key task for successful installation of the echo sounder system. Not only will you need to penetrate the vessel's hull, you must also to select a physical location for maximum performance and minimum acoustic and electric noise.

Prerequisites

To get a full overview of the installation, you need all relevant vessel drawings. You also need the drawings provided for the ES38-7 transducer.

Context

The outline dimensions of the ES38-7 transducer and the relevant installation items can be found in the *Drawing file* chapter in this manual.

End user manuals and source drawings (normally in AutoCad format) can be downloaded from our website.

- https://www.simrad.com

A transducer must always be handled as a delicate instrument. Incorrect actions may damage the transducer beyond repair. Observe these transducer handling rules:

- **Do not** activate the transducer when it is out of the water.
- **Do not** handle the transducer roughly and avoid impacts.
- **Do not** expose the transducer to direct sunlight or excessive heat.
- **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.
- **Do not** damage the outer protective skin of the transducer face.
- **Do not** lift the transducer by the cable.
- **Do not** step on the transducer cable.
- **Do not** damage the transducer cable, and avoid exposure to sharp objects.

Procedure

1 Determine the physical location of the transducer.

The decision must be based on:

- The vessel drawings
- The shape and properties of the hull

Make sure that all possible considerations are made to reduce noise.

- Transducer installation principles, page 45
- Where to install the transducer, page 64

2 Based on the shape of the transducer housing, and the mounting devices available, determine the installation method.

3 Design, manufacture and mount the necessary fairing, installation blister, keel box and/or tank that is required to mount the transducer.

4 Install the bushing.

5 Design, manufacture and mount the steel conduit for the transducer cable.

6 Unpack the transducer from its transport crate.

7 Position the transducer under the mounting location.

8 Pull the transducer cable up through the steel conduit.

9 Tighten the packing nipple on the cable gland properly to avoid leaks.

10 Mount the transducer.

11 Seal the top of the steel conduit to prevent water leaks.

12 Connect the transducer cable to the transceiver.

13 If your vessel will operate in waters with a lot of marine growth, consider applying a thin layer of anti-fouling paint to the transducer face.

Related topics

Installing the transducer, page 21
Designing, manufacturing and mounting the installation hardware, page 24
Installing the cable gland, page 25
Designing, manufacturing and mounting the steel conduit, page 27
Unpacking the transducer from its transport crate, page 29
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Splicing the cable using a grounded junction box, page 36
Splicing the cable using a junction box isolated from vessel's ground, page 37
Connecting the transducer cable to the transceiver, page 38
Painting the transducer face, page 19

Designing, manufacturing and mounting the installation hardware

Once the physical location of the transducer has been determined, the installation hardware must be designed, manufactured and mounted.

Prerequisites

Before you can do this task, the following prerequisites must be met:

- All relevant vessel and transducer drawings must be available.
- All relevant work instructions, procedures and standards must be available.
- The physical location of the transducer has been determined.
- The installation method has been determined.
- The cable gland has been installed.
- All relevant personnel (naval architects, designers, skilled shipyard workers) and tools must be available.

Context

The installation shipyard must provide all necessary installation drawings. If required, all drawings and documents provided by shipyard for the installation of the transducermust be approved by the vessel's national registry and corresponding maritime authority and/or classification society.The shipowner and the shipyard doing the installation are responsible for obtaining and paying for such approval.

The outline dimensions of the ES38-7 transducer and the relevant installation items can be found in the *Drawing file* chapter in this manual. Relevant outline dimensions and

production drawings can be download from our website. The source drawings are available in AutoCad format.

Procedure

1 Based on the vessel drawings, the physical properties of the hull, and the functionality required by the ES38-7, design the mounting hardware.

2 Manufacture the hardware according to the relevant production standards.

3 Mount the hardware under the vessel's hull.

Note

Make sure that the surface of the resulting installation is as smooth and streamlined as possible. Mounting screws or bolts must not be extruding from the hull or from the installation hardware. Make sure that the surface of the transducer face, the hull plating and putty around the transducer is as even and smooth as possible. Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

4 If relevant, allow the relevant maritime authority and/or classification society to inspect and approve the design and installation.

Related topics

Installing the transducer, page 21
Drawing file, page 72

Installing the cable gland

In order to secure the vessel's watertight integrity, it is extremely important that the transducer cable penetrates the ship's hull in a safe manner. One suggested method is to use a cable gland. The cable gland consists of a bushing, rubber gasket, washers and a packing nipple.

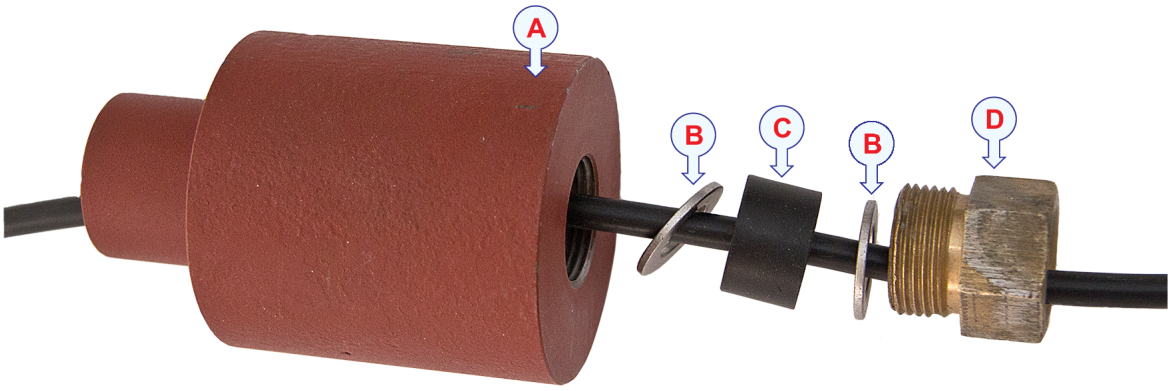
Prerequisites

Before you can install bushing, the following prerequisites must be met:

- The transducer cable must be fitted with the rubber gasket, washers and packing nipple.
- The installation arrangement has been approved by the relevant authority.
- All relevant personnel (skilled shipyard workers, ships electricians) and relevant tools must be available.

Context

These items are all provided as a part of the transducer delivery.



A *Bushing, penetrates the hull plating*

B *Washers*

C *Rubber gasket*

D *Packing nipple*

Procedure

1. Depending on the chosen installation method (blister or tank), make a hole for the bushing.
2. Weld the bushing to the steel plate.
3. Verify the quality of the weld.
4. If relevant, allow the maritime authority and/or classification society to inspect and approve the installation.

Further requirements

Before you can put the transducer cable through the cable gland, the steel conduit must be installed.

Related topics

Installing the transducer, page 21
Designing, manufacturing and mounting the steel conduit, page 27
About cable glands, page 54
Installing the transducer cable, page 30

Designing, manufacturing and mounting the steel conduit

A steel conduit is used to protect the transducer cable. The conduit serves two purposes. It will protect the cable, and shield it from electric noise. Depending on how the steel conduit is terminated over the transducer, it may also secure the watertight integrity of the vessel.

Prerequisites

To design, manufacture and mount the steel conduit, the following prerequisites must be met:

- All relevant vessel and transducer drawings must be available.
- All relevant work instructions, procedures and standards must be available.
- The physical location of the transducer has been determined.
- The installation method has been determined.
- The cable gland has been installed.
- All relevant personnel (naval architects, designers, skilled shipyard workers) and tools must be available.

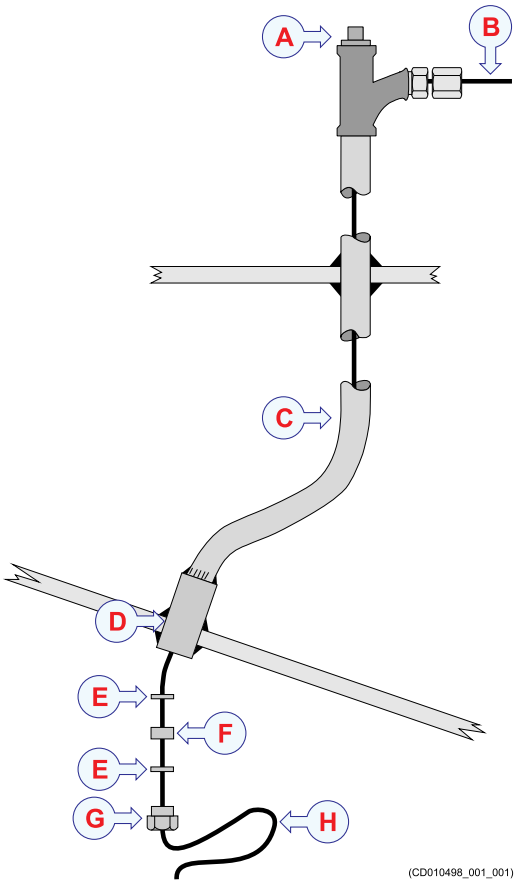


Illustration:

A *Service access (optional)*

B *To transceiver*

C *Steel conduit*

D *Bushing penetrates the hull plating*

E *Washer*

F *Rubber gasket*

G *Packing nipple*

H *Cable service loop over the transducer*

Context

The installation shipyard must provide all necessary design and installation drawings, as well as the relevant work standards and mounting procedures. If required, all documents

provided by the shipyard for the physical installation of the ES38-7 must be approved by the vessel's national registry and corresponding maritime authority and/or classification society. Such approval must be obtained before the installation can begin. The shipowner and shipyard doing the installation are responsible for obtaining and paying for such approval.

Important

Finalize the steel conduit installation before you pull the transducer cable through it. Make sure that there are no spatter, sharp edges or protruding objects that can damage the transducer cables. If a cable is damaged, and penetrated by water, the transducer may be damaged beyond repair.

The outline dimensions of the ES38-7 transducer and the relevant installation items can be found in the *Drawing file* chapter in this manual. End user manuals and source drawings (normally in AutoCad format) can be downloaded from our website.

- https://www.simrad.com

Procedure

1 Based on the vessel drawings, the physical properties of the decks and bulkheads, and the physical locations of the transceiver and the transducer, design the steel conduit.

   The steel conduit must preferably be straight. Start the conduit immediately above the transducer, and terminate it well above the water line. If you must introduce bends on the steel conduit, take the minimum cable bending radius into consideration.

2 Manufacture the steel conduit according to the relevant production standards.

3 Mount the steel conduit.

   Secure the steel conduit to decks and/or bulkheads with welds. Observe relevant requirements and guidelines from the classification society, and make sure that the conduit is properly supported, strong and watertight.

   Note

   The quality of the welding is critical to the safety of the vessel. Welding must only be done by a certified welder.

4 If relevant, allow the maritime authority and/or classification society to inspect and approve the design and the installation of the steel conduit.

Related topics

Installing the transducer, page 21
About cable glands, page 54
Installing the cable gland, page 25
Installing the transducer cable, page 30

Unpacking the transducer from its transport crate

Prior to installation, the transducer must be unpacked from its box, and placed under the mounting location.

Context

A transducer must always be handled as a delicate instrument. Incorrect actions may damage the transducer beyond repair. Observe these transducer handling rules:

- **Do not** activate the transducer when it is out of the water.
- **Do not** handle the transducer roughly and avoid impacts.
- **Do not** expose the transducer to direct sunlight or excessive heat.
- **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.
- **Do not** damage the outer protective skin of the transducer face.
- **Do not** lift the transducer by the cable.
- **Do not** step on the transducer cable.
- **Do not** damage the transducer cable, and avoid exposure to sharp objects.

Procedure

1 Place a protective mat on the cart to safeguard the transducer face.

2 Open the shipping box.

Note

Be careful! Do not use heavy tools. Do not use excessive force. Make sure that you do not damage the transducer or the cable.

3 Lift the transducer straight up and out of the box.

Note

DO NOT lift it by the cable!

4 Place the transducer on the cart for transport to the mounting location.

5 Transport the transducer carefully to its mounting location.

Related topics

Installing the transducer, page 21

Installing the transducer cable

When the transducer has been placed under its mounting location, the cable can be pulled through the cable gland and bushing, and then through the steel conduit up to the transceiver.

Prerequisites

Before you can do this task, the following prerequisites must be met:

- All relevant work instructions, procedures and standards must be available.
- The bushing has been installed.
- The steel conduit is mounted with all installation work finalized.
- All relevant drawings have been approved by the classification society.
- All relevant personnel (skilled shipyard workers, ship electricians) and their tools must be available.

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks. This includes different screwdriver types, pliers, spanners, a cable stripper, a soldering iron, etc. We recommend that all tools are demagnetized to protect your equipment. The following specific consumables are required for this task:

- Fish tape (wire pulling tool) with suitable length
- Electrician’s tape
- Wire wraps

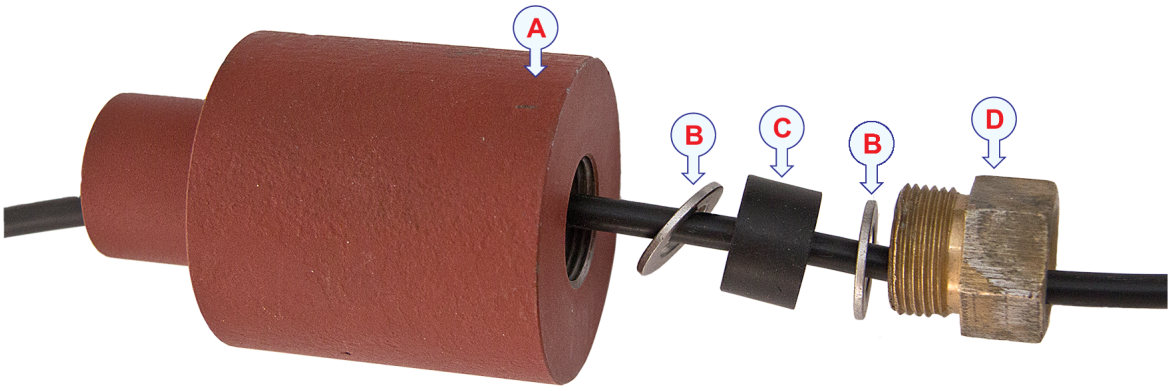
Context

The transducer cable is attached to the transducer, and it has a fixed length. The bushing and the associated parts are included in the delivery.

Note

All necessary precautions must be made to avoid damage to the cable while pulling it through the steel conduit. Make sure that all welding has been finalized before you pull the cable through the steel conduit. Heat may cause serious damage to the cable and the transducer.

These items are all provided as a part of the transducer delivery.



A *Bushing penetrates the hull plating*

B *Washer*

C *Rubber gasket*

D *Packing nipple*

Procedure

1 Make sure that the steel conduit has been finished, and that all welding has been finalized.

2 Lower the fish tape (wire pulling tool) down from the top of the steel conduit, and through the bushing.

3 Make sure that the rubber gasket, washers and packing nipple are threaded onto the transducer cable.

These items are kept between the bushing and the transducer.

The packing nipple, rubber gasket and washers are provided with the transducer. Upon delivery, they are threaded onto the cable and temporarily secured, normally with wire wraps.

4 Fasten the end of the fish tape to the transducer cable using electrician's tape.

5 Pull the cable carefully up through the steel conduit.

Continue until you reach the transceiver.Allow the transducer cable to form a service loop close to the transducer.

Note

Be careful! Make sure that you do not damage the outer surface of the transducer cable. If water leaks into a cable, it may damage the transducer beyond repair.

6 Allow the transducer cable to form a service loop close to the transducer.

7 Mount the packing nipple.

8 Tighten the packing nipple with enough force to inhibit water penetration.

When the packing nipple has been tightened, pull each cable to verify that it is fastened properly. If you can move the cable, you must tighten the packing nipple harder.

9 Seal the top of the steel conduit with a Roxtec (or similar) multi-diameter cable sealing.

Related topics

Installing the transducer, page 21
Designing, manufacturing and mounting the steel conduit, page 27
About cable glands, page 54
Installing the cable gland, page 25

Mounting the transducer

When all the preparations have been made, the transducer is mounted. If required, additional and more detailed procedures must be provided by the installation ship yard.

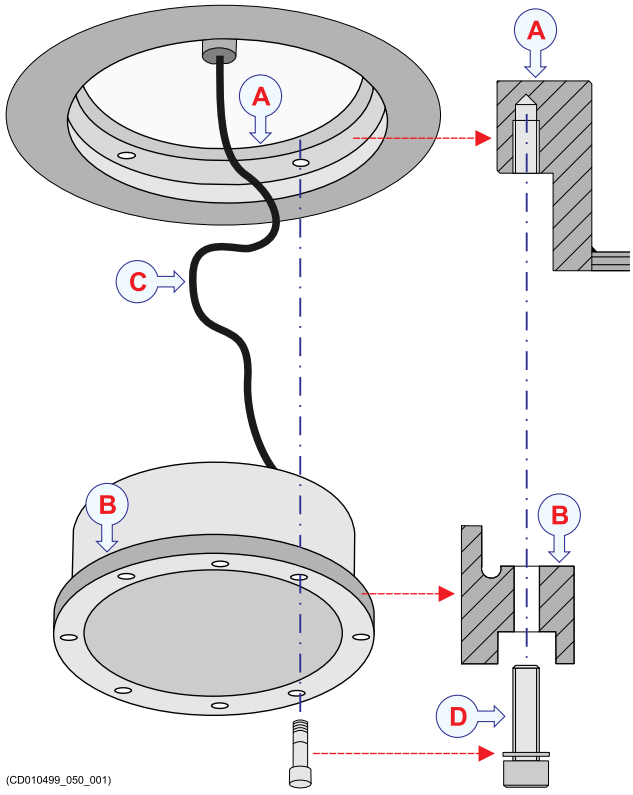
Prerequisites

The following requirements must be met before mounting the transducer:

- The physical location of the transducer has been determined.
- The mounting ring has been installed.
- The steel conduit is mounted with all installation work finalized.

Note

Whenever relevant, all drawings as well as the physical installation of each device must be approved by the vessel's national registry and corresponding maritime authority and/or classification society.



The following special tools are required for this installation:

- Torque wrench for the mounting bolts
- Loctite 270 (permanent high-strength threadlocker)
- Lifting device

Illustration:

A *Mounting ring*

B *Clamping ring*

C *Cable service loop*

D *Bolt*

Context

Observe the physical size and weight of the transducer. Unless a suitable lifting device is available, make sure that enough manpower is available to lift, hold and fasten the transducer.

Note

The ES38-7 is often used as a replacement for the discontinued ES38B. If you do that, make sure that the horizontal support bar used on the ES38B is removed before you mount the ES38-7.

Procedure

1 Lift the transducer up into its location.

2 Align the holes on the mounting flange with the holes in the mounting ring.

Note

Observe the direction of the transducer. The "forward" marking must point towards the bow of the vessel!

3 Mount the transducer using the bolts provided. Apply Loctite 270 to secure the bolts.

Use the following maximum torque: 32 Nm.

4 When the transducer has been fastened, inspect the plating around the transducer face.

Important

Make sure that the surface of the transducer face, as well as the plating and putty around the transducer is as even and smooth as possible. Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

5 If required, allow the relevant maritime authority and/or classification society to inspect and approve the transducer installation.

Related topics

Installing the transducer, page 21
Using self-locking taps, page 61

Splicing the transducer cable

If you need to cut or lengthen the transducer cable, you must splice it correctly. This is very important, as any splice is very vulnerable for noise.

Cable can be spliced using two different methods:

- Splicing using a grounded junction box
- Splicing using a junction box that is isolated from vessel's ground

The following items are required.

- A metal junction box with cable glands designed for electromagnetic compatibility (EMC). The junction box must contain a suitable terminal block. The terminal block must provide solid fastening of the cable ends as well as sufficient insulation between the wires.
- The necessary length of transducer cable.

  The cable between the junction box and the transceiver must be supplied by Kongsberg Maritime, and this must be the same type as used on the transducer.

Electrical installations can only be done by certified electricians. All necessary tools and instruments required must be available. The installation shipyard must prepare detailed drawings of the electrical system, and identify each cable.

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks. This includes different screwdriver types, pliers, spanners, a cable stripper, a soldering iron, etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

Note

Do not solder the wires together with only electrical tape for insulation. This will result in electrical noise and reduced operational performance.

Topics

Splicing the cable using a grounded junction box, page 36

Splicing the cable using a junction box isolated from vessel's ground, page 37

Splicing the cable using a grounded junction box

Context

Do not solder the wires together with only electrical tape for insulation. This will result in electrical noise and reduced operational performance.

A *Junction box*

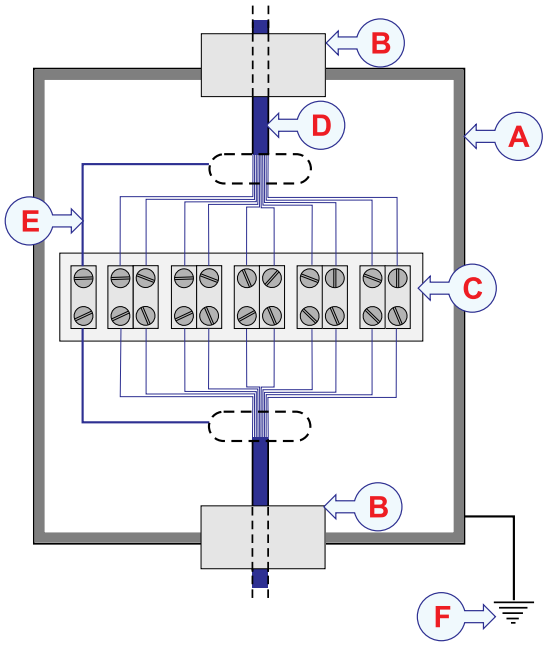
B *Cable gland*

C *Terminal block*

D *Cable*

E *Cable screen*

F *The junction box may be connected to ship's ground.*



Procedure

1 Mount the junction box in a suitable location.

2 Terminate the steel conduits containing the transducer cables to the housing of the junction box, or as close to the junction box as possible.

3 Feed the cables through the cable glands.

4 Remove the insulation from each cable and connect the individual conductors to the terminal block.

5 Connect the screen from both ends of the transducer cable together.

6 Make sure that the screens on the transducer cables do not have any electrical connection to the junction box housing or cable gland. Insulate the screens if necessary.

Related topics

Installing the transducer, page 21
Connecting the transducer cable to the transceiver, page 38
12-pin Amphenol plug , page 44

Splicing the cable using a junction box isolated from vessel's ground

Context

Do not solder the wires together with only electrical tape for insulation. This will result in electrical noise and reduced operational performance.

Do not connect the cable screen to the vessel's ground.

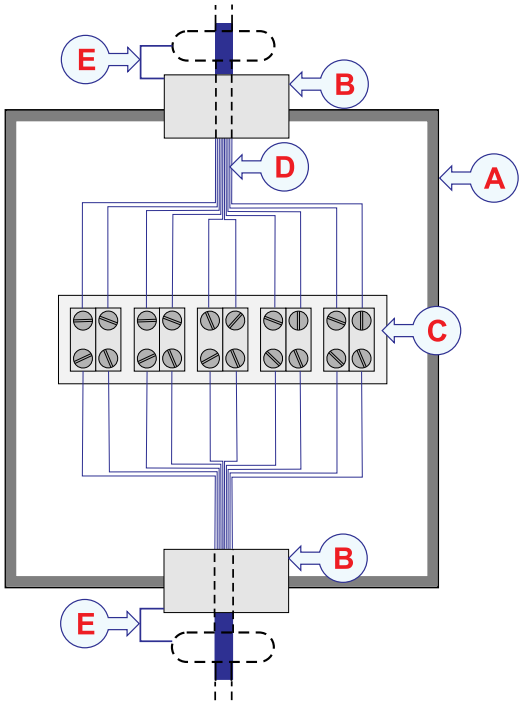
A *The junction box is isolated from ship's ground.*

B *Cable gland*

C *Terminal block*

D *Cable*

E *Cable screen*



Procedure

1 Mount the junction box in a suitable location.

2 Terminate the steel conduits containing the transducer cables as close to the junction box as possible.

3 Verify that the junction box chassis is not connected to the vessel's ground.

If necessary to isolate the junction box completely, use additional insulation.

4 Remove the insulation on the transducer cable, and connect the individual conductors to the terminal block.

5 Remove the insulation on the extension cable, and connect the individual conductors to the terminal block.

6 Make sure that you have connected the wires 1:1, and that the colours match.

7 Connect the cable screens to the cable glands in the junction box.

Related topics

Installing the transducer, page 21
Connecting the transducer cable to the transceiver, page 38
12-pin Amphenol plug , page 44

Connecting the transducer cable to the transceiver

Once the transducer cable has been installed, you can connect it to the transceiver using the plug provided.

Prerequisites

Electrical connections can only be made by skilled personnel (ship electricians, technicians or engineers). All necessary tools and instruments required must be available. The installation shipyard must prepare detailed drawings of the electrical system, and identify each cable.

You must be equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks. This includes different screwdriver types, pliers, spanners, a cable stripper, a soldering iron, etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

Context

The ES38-7 transducer can be used with a variety of echo sounder transceivers. These use different plugs and connectors.

Procedure

1. Make sure that an ample length of the transducer cable is available for maintenance and replacement.
2. Cut the transducer cable.
3. Remove the insulation on the wires in the transducer cable.
4. Mount the transducer plug - or make the connection to the transceiver - as described in *Cable layout and interconnections*.
   - Cable layout and interconnections, page 41

Related topics

Installing the transducer, page 21
Splicing the transducer cable, page 35
Splicing the cable using a grounded junction box, page 36
Splicing the cable using a junction box isolated from vessel's ground, page 37
12-pin Amphenol plug , page 44

Painting the transducer face

Marine growth (biological fouling) on the transducer face reduces the ES38-7 performance. We recommend that you paint the transducer face immediately after installation, and then again as often as required to maintain the protection.

Prerequisites

The following tools and consumables are required.

- Personal protection
- Fresh water
- A mild synthetic detergent and a plastic brush
- Fine-grade sandpaper (240 inch grit size)
- Primer
- Anti-fouling paint
- Wet film gauge
- Airless spray

Because some paint types may be aggressive to the polyurethane in the transducer, consult our list of approved paints.

Context

The transducer has not been designed with any protection against biological fouling. Anti-fouling paint may therefore be applied to the transducer face. To minimize the negative acoustical effects the layer of anti-fouling paint must be as thin as possible.

Note

The anti-fouling paint will reduce the acoustical performance of the transducer. The surface roughness of the transducer substrate and the thickness of the paint may also influence the performance. Kongsberg Maritime cannot be held responsible for any negative consequences of the anti-fouling paint.

Observe the relevant instructions and safety information provided by the paint manufacturer.

Procedure

1 Clean the transducer thoroughly.

  Make sure that you remove all oil grease residues, as well as salt and other contamination.

2 Allow the transducer surface to dry.

3 Abrade the transducer surface using a sanding paper with 240 inch grit size.

Do not exceed a surface roughness (R_{max}) of 35 microns as this can influence the ES38-7 performance.

4 Remove all dust.

5 Apply the primer, and let it dry.

6 Apply the paint.

Observe the instructions provided by the paint manufacturer. Use airless spray. Apply the minimum specified film thickness per coat and for the complete layer. It is not possible to measure dry film thickness on transducer surface. You must therefore use a wet film gauge to frequently measure the paint thickness.

Note

We strongly recommend that you do not use a paintbrush and/or a roller.

7 Allow the paint to dry.

Further requirements

The contractor or shipyard must keep a daily paint log recording all relevant information from the surface treatment.

Related topics

Transducer handling and maintenance, page 13
Approved anti-fouling paints, page 15
Inspecting and cleaning the transducer face, page 17
Installing the transducer, page 21

Cable layout and interconnections

Topics

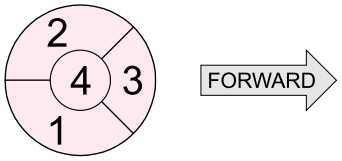
ES38-7 Connecting to a 12-pin Amphenol socket, page 42

12-pin Amphenol plug , page 44

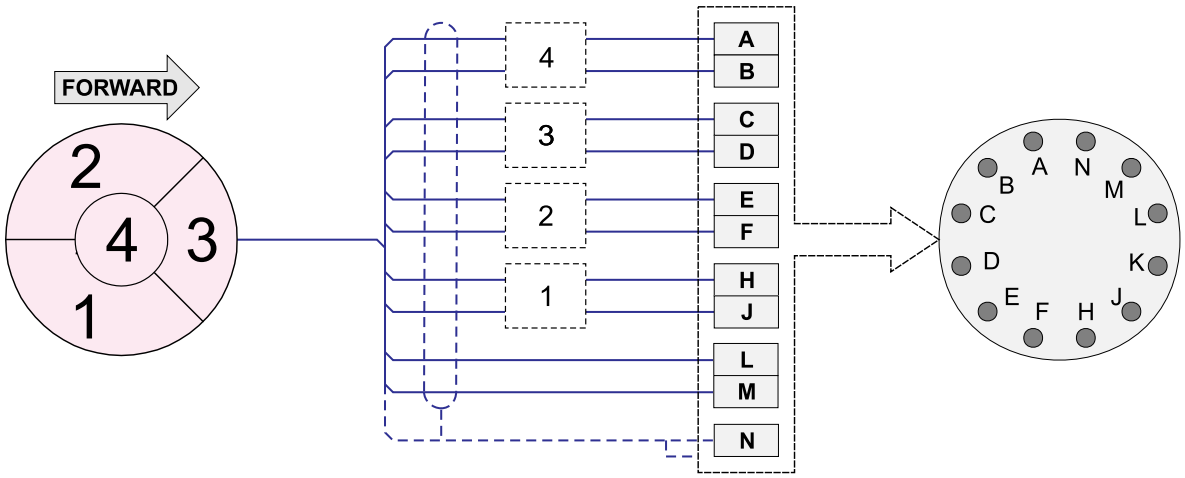
ES38-7 Connecting to a 12-pin Amphenol socket

The Simrad ES38-7 is a wide band split beam transducer designed for fishery and underwater science applications. The transducer shall be connected to terminals **A** through **N** on a circular 12-pin Amphenol socket (Type 97-12-19S). This socket is used on some versions of the Wide Band Transceiver (WBT).

The other end of the cable is permanently fixed to the transducer.



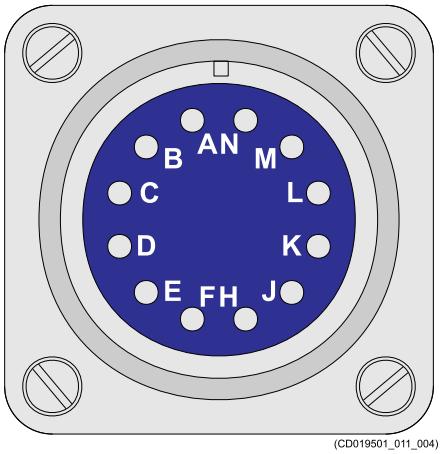
It is very important that the transducer is correctly installed with the sectors positioned as shown in the illustration (seen from above). Each sector is connected to a dedicated transceiver channel. In this context, the phrase *transceiver channel* is used to describe one single pathway through the transceiver. This pathway contains one transmitter, one preamplifier and the necessary transmit/receive switching circuitry.



Sector	Cable colours	Terminal on socket	Transceiver channel
1	White	H	1
	Black	J	
2	Green	E	2
	Black	F	
3	Yellow	C	3
	Black	D	
4	Blue	A	4
	Black	B	

Digital output	Red	L	
Digital ground	Black	M	
Cable screen	Screen	N	

The cable screen must be connected to the housing on the transducer plug.



Note

The black wires in the transducer cable are not for grounding. You must never connect these together, and you must not connect any of them to vessel ground.

If you need to splice the transducer cable, we strongly recommend the use of a metal junction box with proper cable glands. The cable screen must be connected to the cable glands. The cable screen and the junction box chassis must not be connected to vessel ground. Avoid ground loops. You must use the same type of cable as the original transducer cable, contact Kongsberg Maritime for advice.

We strongly recommend that you install the transducer cable in a steel conduit.

Note

The software license controls how the transducer is connected to the transceiver. The **License Details** *text box explains which transceiver channels that are used. Each channel available is listed with the relevant operational frequency and power capacity. For more information, refer to the context-sensitive on-line help.*

Minimum cable requirements

Not applicable. If you need an extension cable, contact your dealer (or Kongsberg Maritime) for support.

Related topics

12-pin Amphenol plug , page 44

12-pin Amphenol plug

The transducer socket on the transceiver allows you to connect one or more single or split beam transducers using a 12-pin Amphenol plug (97-24-19P).

In order to connect the transducer cable to the plug, the plug must be disassembled as described below.

A Disassemble the plug.

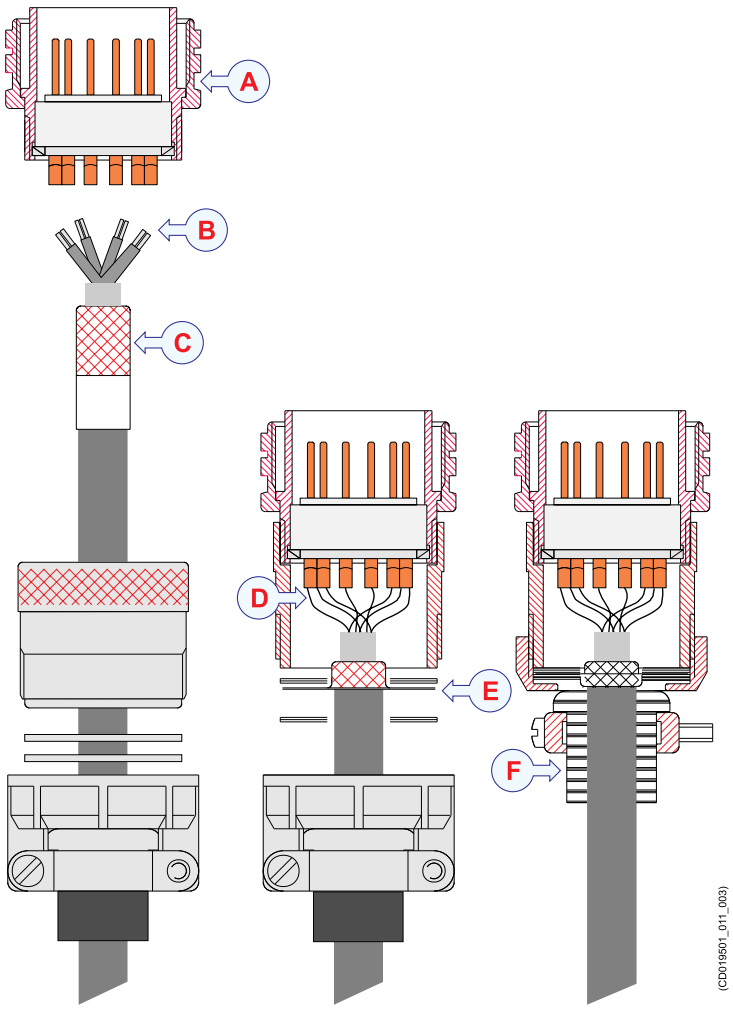
B Remove a few millimeters of the insulation on the individual cables.

C Fold the outer and inner screen backwards, and fasten them temporary with tape.

D Thread each wire through a heat-shrinkable tubing, solder the wire end to the appropriate pin, and insulate with the heat-shrinkable tubing.

E Remove the tape from the outer and inner screen, and spread the screens out to place them between the large washers.

F Assemble the plug house, and tighten the rubber sleeve.



Related topics

Splicing the transducer cable, page 35
Splicing the cable using a grounded junction box, page 36
Splicing the cable using a junction box isolated from vessel's ground, page 37
Connecting the transducer cable to the transceiver, page 38
ES38-7 Connecting to a 12-pin Amphenol socket, page 42

Transducer installation principles

Topics

Transducer installation in a blister, page 46

Transducer installation in keel box, page 49

Transducer installation using an arctic tank with acoustic window, page 50

Transducer installation using drop keel, page 52

About cable glands, page 54

Using a steel conduit to protect the transducer cable, page 58

Smooth surface is important, page 60

Using a suitable inclination angle, page 60

Using self-locking taps, page 61

Transducer installation in a blister

In order to install a transducer with a circular housing, one recommended installation method is by means of a blister. The blister must be designed and manufactured by the installation shipyard to fit the transducer, as well as the vessel's size and hull shape. The transducer may be added to an already existing blister that also holds other flush mounted transducers.

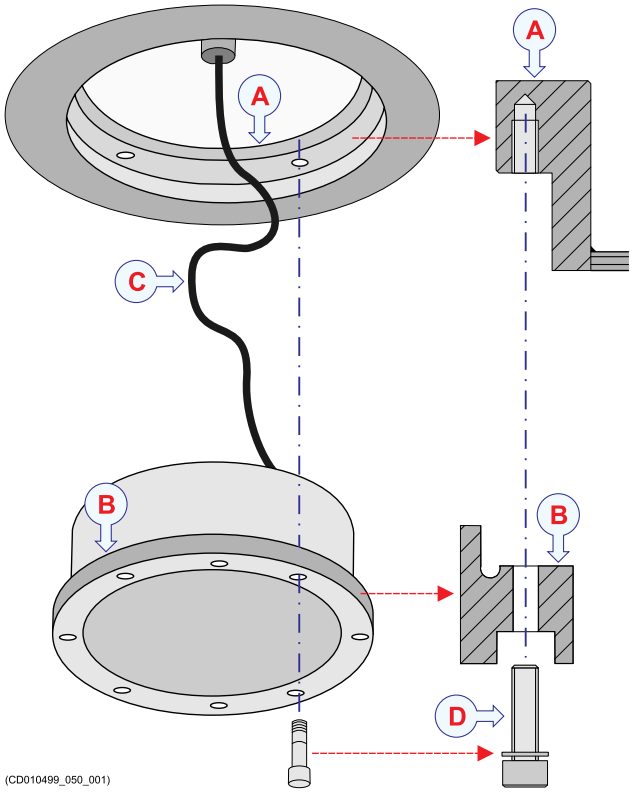
Illustration:

A *Mounting ring*

B *Clamping ring*

C *Cable service loop*

D *Bolt*



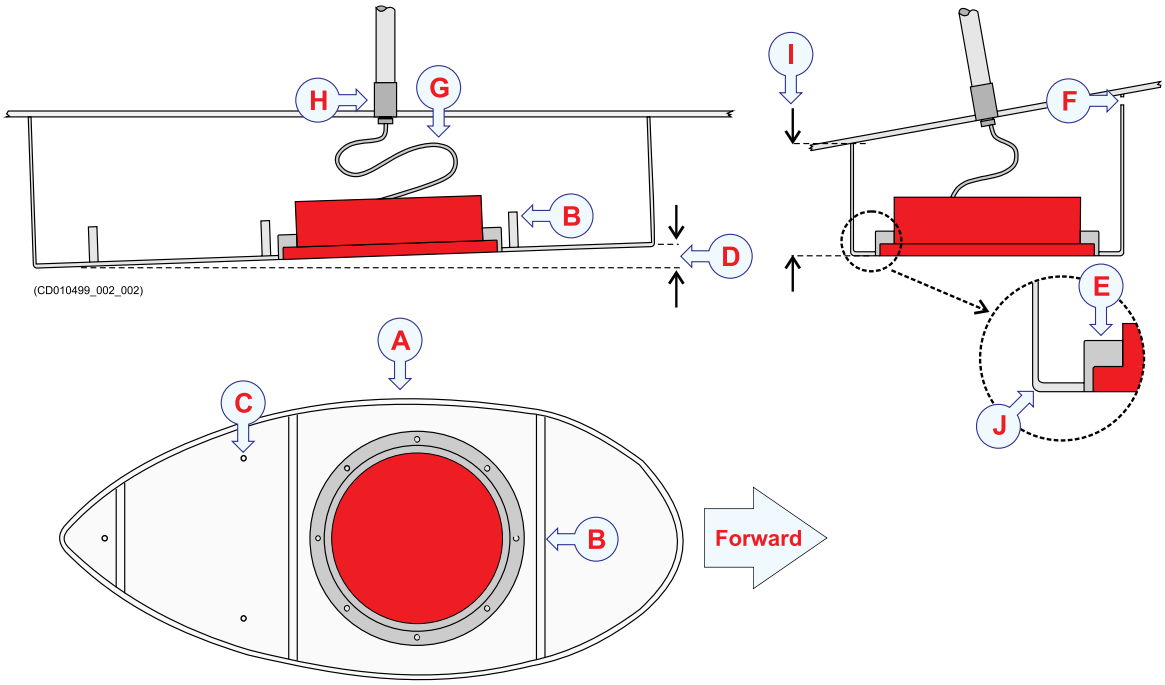
The best performance is obtained with a blister height of 40 cm or more. A streamlined shape and rounded edges reduce the flow noise. A vertical leading edge or front will guide the aerated water to the sides of the blister.

The orientation of the blister should follow the water flow.

The interior of the blister must be filled with sea water. Use drainage holes in the bottom and an air outlet on the top. The water pressure behind the transducer will then compensate for the outside pressure during vessel movements in rough sea. This is an important security precaution to prevent damage to the transducer.

The transducer cable penetrates the hull using a cable gland which consists of bushing, washer, rubber gasket and packing nipple. Leave an adequate loop of the cable over the transducer body inside the blister for easy mounting or removal of the transducer.

Example



A *Streamlined blister*

B *Stiffening rib*

C *Drainage holes*

D *Inclination angle*

E *Mounting ring*

F *Air outlet*

G *Cable service loop*

H *Bushing*

I *Height: 400 mm (Minimum)*

J *Rounded corners*

Physical location of the blister

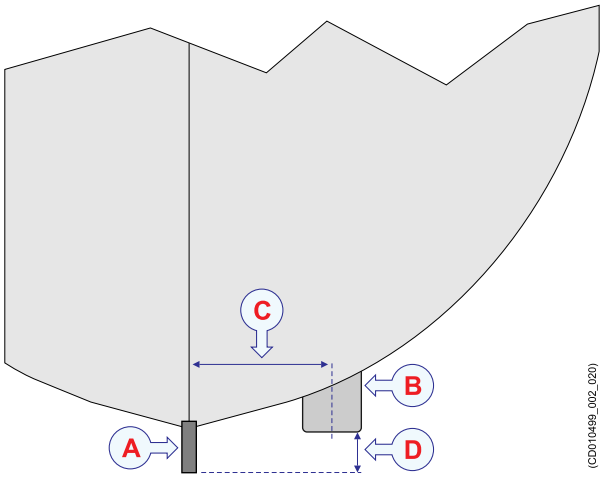
The blister is placed on the side of the hull. The distance from the keel is a trade off between a close distance giving a turbulent flow of water in a narrow passage, and a large distance bringing the transducer higher up, and therefore more affected by the vessel roll. Normally a distance of approximately 1 m is a good compromise.

A *Keel*

B *Transducer blister*

C *Horizontal distance between the keel and the blister*

D *Vertical distance between the bottom of the keel and the blister surface*



Observe the horizontal and vertical distances between the keel and the transducer blister. (**C** + **D**)

On a medium sized vessel, the horizontal distance (**C**) should be approximately 1 meter.

The vertical distance must in general be as small as possible. This is important to prevent the keel from shadowing the transducer beam in shallow waters.

Using the mounting ring

This large circular is transducer is designed to be mounted using the integrated flange and a mounting ring.The mounting ring is welded to the hole prepared for the transducer. Bolts through the transducer flange into the mounting ring will secure the transducer in place.

Note

Make sure that the "Forward" direction on transducer points in the forward direction of the vessel.

A suitable mounting ring can be provided by Kongsberg Maritime. A drawing is available for local manufacturing. The drawing (normally in AutoCad format) can be downloaded from our website.

- https://www.simrad.com

Smooth surface is important

Make sure that the surface of the transducer face, as well as the plating and putty around the transducer is as even and smooth as possible.Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Mounting screws or bolts must not be extruding from the transducer or the plating immediately around it.

Note

Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Related topics

Transducer installation principles, page 45

Transducer installation in keel box

Vessels with a keel box may use this for transducer installation. The keel is already the deepest part of the vessel. If the keel is too narrow to accommodate the transducer, it can be widened, either symmetrically or to one side only. If the keel width is increased to one side only, the installation principle could also be regarded as a blister merged into the keel.

Example

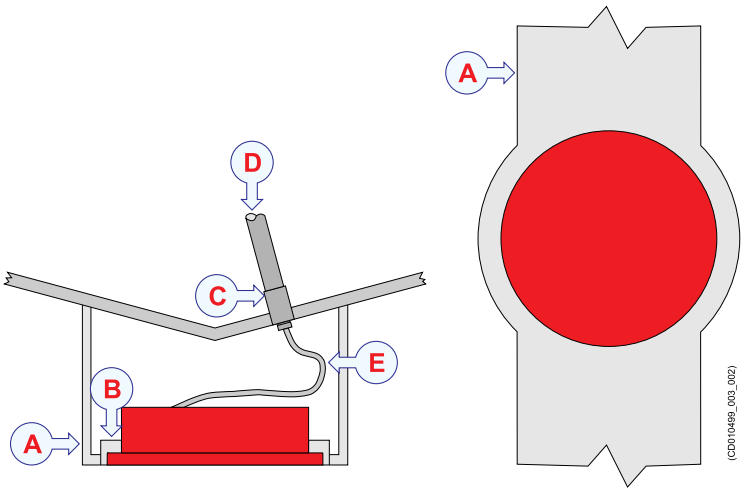
A *Keel box*

B *Mounting ring*

C *Bushing*

D *Cable in steel conduit*

E *Cable service loop*



Using the mounting ring

This large circular is transducer is designed to be mounted using the integrated flange and a mounting ring.The mounting ring is welded to the hole prepared for the transducer. Bolts through the transducer flange into the mounting ring will secure the transducer in place.

Note

Make sure that the "Forward" direction on transducer points in the forward direction of the vessel.

A suitable mounting ring can be provided by Kongsberg Maritime. A drawing is available for local manufacturing. The drawing (normally in AutoCad format) can be downloaded from our website.

- https://www.simrad.com

Smooth surface is important

Make sure that the surface of the transducer face, as well as the plating and putty around the transducer is as even and smooth as possible. Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Mounting screws or bolts must not be extruding from the transducer or the plating immediately around it.

Note

Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Related topics

Transducer installation principles, page 45

Transducer installation using an arctic tank with acoustic window

Vessels operating in arctic waters need special attention on transducer installation. Floating blocks of ice may damage even a flush mounted transducer face. For this situation Kongsberg Maritime offers arctic tanks in different sizes.

Arctic tanks are fitted with special purpose acoustic windows that protect the transducer face.

The acoustic window is normally manufactured using polycarbonate.

The tank is filled with fluid that consists of 20% proplylene glycol and clean water. This fluid is well suited for this purpose. It contains no gas bubbles and is non-corrosive.

A *Bushing*

B *Steel pipe(minimum1.5m above waterline)*

C *11/4" Plug BSP*

D *Charge line , 20% propylene glycol and clean water above double bottom with easy access*

E *Air vent screw*

F *Liquid filled (20% propylene glycol and clean water)*

G *Trunk*

H *Transducer*

I *Transducer cable*

J *Bolt*

K *Bolt*

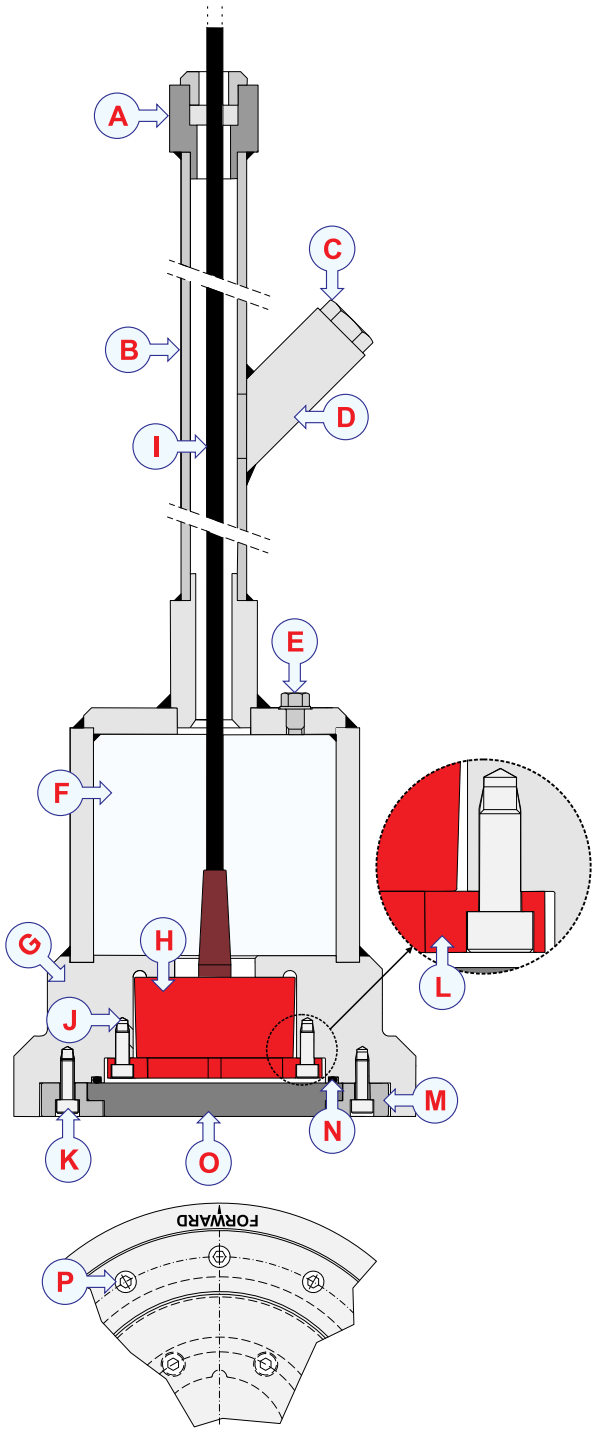
L *Clamping ring (already a part of transducer)*

M *Clamping ring arctic tank*

N *O-ring*

O *Acoustic window*

P *Apply loctite and tighten all bolts in a crisscross sequence*



Note

Make sure that the "Forward" direction on transducer points in the forward direction of the vessel.

Smooth surface is important

Make sure that the surface of the transducer face, as well as the plating and putty around the transducer is as even and smooth as possible.Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Mounting screws or bolts must not be extruding from the transducer or the plating immediately around it.

Note

Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Related topics

Transducer installation principles, page 45

Transducer installation using drop keel

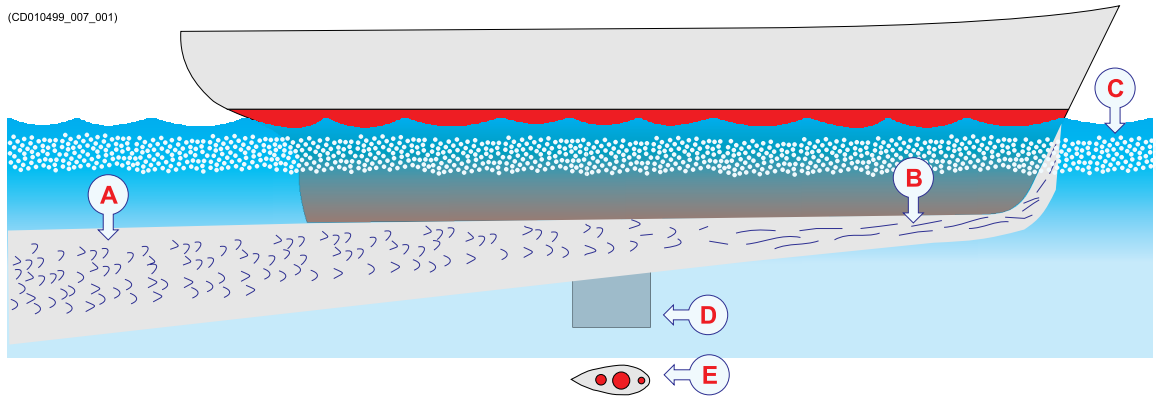
If your vessel is fitted with a drop keel, this is a superior platform for the ES38-7 transducer.

Drop keels are often used on larger research vessels. A drop keel will frequently protrude as far as three meters below the hull. At that depth, the water is free of air bubbles up, even during very high sea states. The vessel is then able to do reliable acoustic measurements in open sea a larger part of the year.

At the bottom of the drop keel, the ES38-7 can be installed with the transducer face flushed with the horizontal plating. A protective tank may not be necessary, since the drop keel will normally offer adequate protection.

The drop keel is normally used for several echo sounder transducers. When the ES38-7 is mounted externally, you must always place it aft of the remaining flush mounted transducers. This is necessary to avoid turbulence.

The transducer cable must be properly fastened at the bottom of the drop keel, and supported during the lowering and lifting the drop keel.



A *Tubular flow*

B *Laminar flow*

C *Air bubbles in the water*

D *Drop keel (extended)*

E *Several transducers can be installed at the bottom of the drop keel*

Using the mounting ring

This large circular is transducer is designed to be mounted using the integrated flange and a mounting ring.The mounting ring is welded to the hole prepared for the transducer. Bolts through the transducer flange into the mounting ring will secure the transducer in place.

Note

Make sure that the "Forward" direction on transducer points in the forward direction of the vessel.

A suitable mounting ring can be provided by Kongsberg Maritime. A drawing is available for local manufacturing. The drawing (normally in AutoCad format) can be downloaded from our website.

- https://www.simrad.com

Smooth surface is important

Make sure that the surface of the transducer face, as well as the plating and putty around the transducer is as even and smooth as possible.Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Mounting screws or bolts must not be extruding from the transducer or the plating immediately around it.

Note

Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Related topics

Transducer installation principles, page 45

About cable glands

The transducer cable must pass through the hull using approved cable glands for the type of vessel in question.

A steel cable gland is normally used on professional vessels with steel hulls. A bronze cable gland can be used as an option for vessels with wood or fibreglass hulls. Vessel not to be classified can use a cable gland made of plastic.

Note

We strongly recommend that a length of conduit is fitted around transducer cable glands. The conduit must be made of steel or bronze, and must extend above the water-line inside the vessel. This precaution reduces the danger of flooding in the event of gland failure. Transducers installed with a conduit are also easier to replace.

Some vessels may experience difficulties finding suitable areas of the hull for mounting transducer cable glands due to existing water tanks, concrete ballast or other obstacles. A possible solution in such cases is to run the transducer cables in a steel conduit aft along the hull until a suitable cable gland location is available. The respective cable gland can then be installed as described in the following instructions.

Kongsberg Maritime takes no responsibility for the correct installation of cable glands, associated hull modifications and/or structural support of the transducer cable penetration. These activities are subject to individual approval by the respective classification society for the vessel in question.

Related topics

Transducer installation principles, page 45

Cable gland for steel hulls

This cable gland kit is designed for steel vessels. It must be welded to the hull plates.

Note

Kongsberg Maritime takes no responsibility for the correct manufacturing, installation of cable glands, associated hull modifications and/or structural support of transducer cable penetration. These activities are subject to individual approval by the respective classification society for the vessel in question.

A *Steel conduit*

B *Bushing*

C *Washers*

D *Rubber gasket*

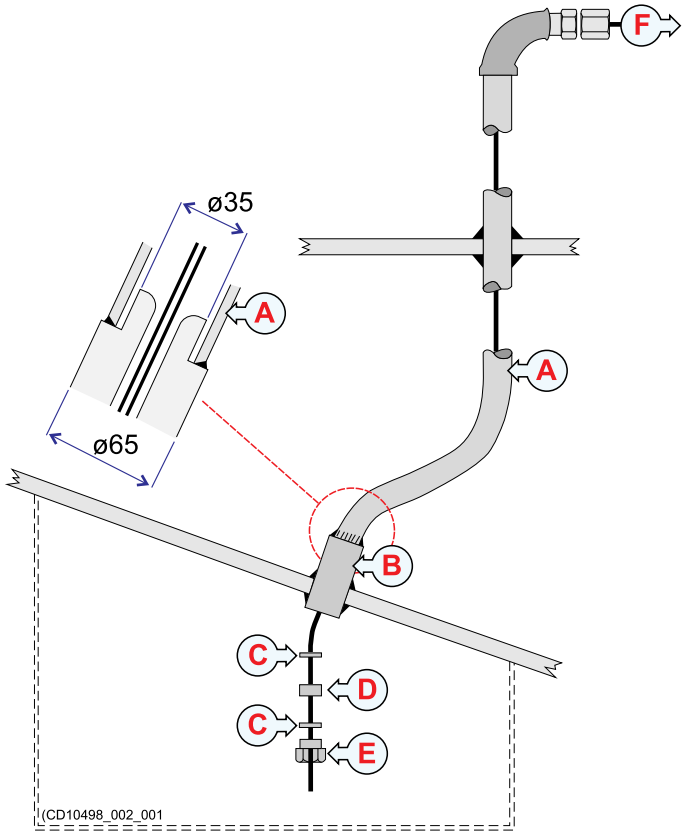
E *Packing nipple*

F *Cable to echo sounder (or a junction box)*

Note

Make sure that you do not damage the transducer cable by tightening the packing nipple too hard.

We recommend that the diameter of the steel conduit is chosen for best possible fit to the bushing on the cable gland. The conduit must extend to above the vessel's water line.



Related topics

Transducer installation principles, page 45

Cable gland for wooden and GRP hulls

A bronze cable gland kit can be made for wooden and GRP vessels.

Note

Kongsberg Maritime takes no responsibility for the correct manufacturing, installation of cable glands, associated hull modifications and/or structural support of transducer cable penetration. These activities are subject to individual approval by the respective classification society for the vessel in question.

The principle for this type of installation is shown in the illustration below.

A *Packing nipple*

B *Washers*

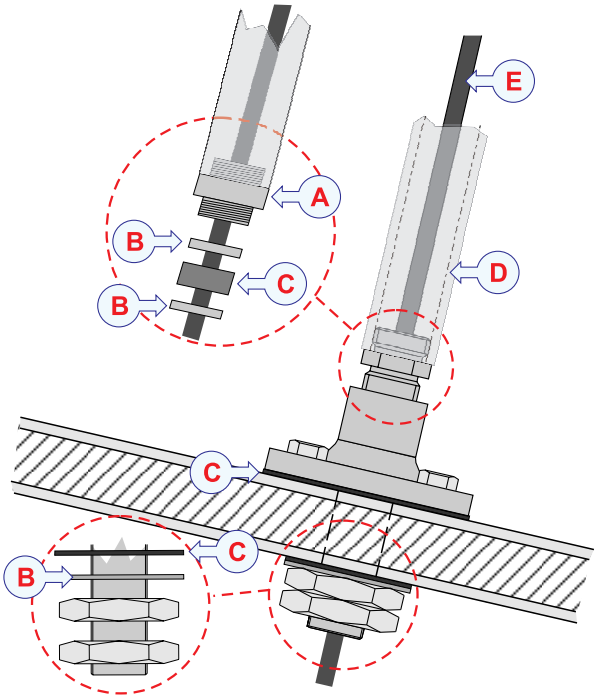
C *Rubber gaskets*

D *Steel conduit*

E *Cable to echo sounder (or a junction box)*

Note

Make sure that you do not damage the transducer cable by tightening the packing nipple too hard.



Related topics

Transducer installation principles, page 45

Cable glands for small hulls

For smaller vessels that do not need to be classified, a different cable gland can be used.

A *Packing nipple*

B *Rubber gaskets*

C *Plastic disc*

D *Rubber gaskets*

E *Bushing*

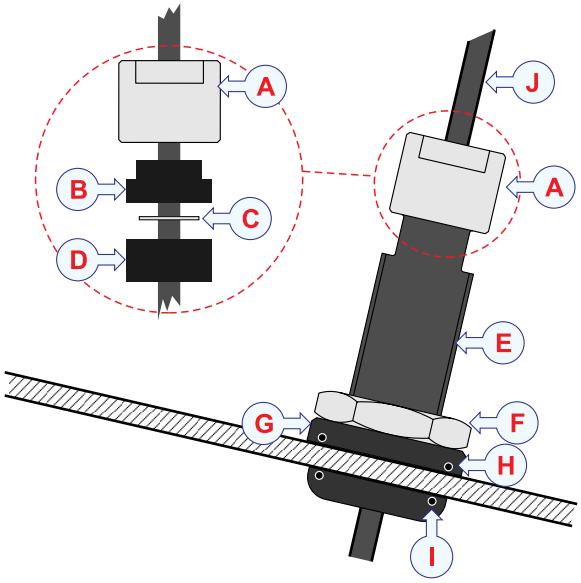
F *Backing nut*

G *Backing washer*

H *O-ring*

I *O-ring*

J *Cable to echo sounder (or a junction box)*



Note

Make sure that you do not damage the transducer cable by tightening the packing nipple too hard.

The O-ring must be clean, in good condition and free of cuts or other defects which could affect their watertight integrity.

Apply ample amount of sealant between the backing washer (H) and the hull plate.

Note

Kongsberg Maritime takes no responsibility for the correct manufacturing, installation of cable glands, associated hull modifications and/or structural support of transducer cable penetration. These activities are subject to individual approval by the respective classification society for the vessel in question.

Related topics

Transducer installation principles, page 45

Part numbers for cable gland kits

The cable glands are available as kits from Kongsberg Maritime.

Hull type	Part number	In the box
Steel	499-037763	Cable gland kit (Cable diameter: 8 to 15 mm)
Steel	305609	Cable gland kit (Cable diameter: 17 to 18.5 mm)
Small	599-202182	Cable gland kit (Cable diameter: 5 to 7 mm)

Related topics

Transducer installation principles, page 45

Using a steel conduit to protect the transducer cable

A steel conduit must be used to protect the transducer cable. The steel conduit must preferably be straight. Start the conduit immediately above the transducer, and terminate it well above the water line.

It is strongly recommended to lay a steel conduit from the cable gland above the transducer to the ES38-7 transceiver, and to pull the transducer cable through this conduit. The conduit serves two purposes. It will protect the cable, and shield it from electric noise. Depending on how the steel conduit is terminated over the transducer, it may also secure the watertight integrity of the vessel.

There are several reasons for this.

- It will make it easier at a later stage to replace the transducer.
- It will protect the cables.
- Noise and interference from other electrical equipment is greatly reduced.
- The risk of flooding is greatly reduced when the steel conduit is terminated above the water line.

With a steel conduit the installation will satisfy the European Union regulations for electromagnetic compatibility (EMC) interference. Without a steel conduit, there is a risk of reduced ES38-7 performance.

Steel conduit quality and shielding

The steel conduit must be unbroken and watertight from the transducer to above the water line. From there, the cable can be pulled further, or a junction box can be installed to facilitate further connections.

Note

The steel conduit must act as a continuous electrical screen all the way.

If two or more transducers are installed close to each other it is possible to pull their cables in the same steel conduit, provided the conduit diameter is increased accordingly. However, for easy replacement it is recommended that each transducer has its own steel conduit.

Steel conduit minimum dimensions

The dimensions of the steel conduit must be specified and/or verified by the relevant maritime authority and/or classification society. The minimum dimensions are:

- **Inside diameter**: 35 mm
- **Wall thickness**:
  - Galvanized: 4.5 mm
  - Not galvanized: 6 mm

Related topics

Transducer installation principles, page 45

Smooth surface is important

Make sure that the surface of the transducer face, as well as the plating and putty around the transducer is as even and smooth as possible. Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

Mounting screws or bolts must not be extruding from the transducer or the plating immediately around it. Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

The space around the threaded rods (or mounting bolts) must be filled with a a suitable filling compound (putty) and/or a locking ring. This is important to secure a firm installation and a level and smooth surface.

Note

Obstructions on these surfaces will create problems with turbulent flow, and may cause noise.

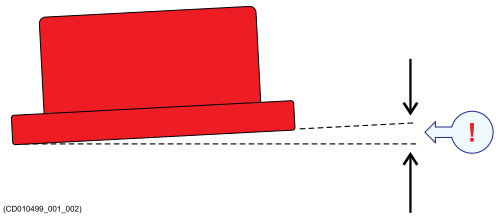
Related topics

Transducer installation principles, page 45

Using a suitable inclination angle

Ideally, the transducer face should be mounted in parallel with the sea surface when the vessel is in normal trim, as this will provide the most accurate echo information. However, it is also very important that the water flow over the transducer face is laminar.

In order to ensure laminar flow, the transducer face must be tilted slightly upwards in relation to the water flow. This allows the flowing water to meet the face directly, and reduces laminar noise.



The inclination angle must be determined carefully. The angle must be small on transducers with a narrow beam angles. As a rule of thumb, mount transducers with beam angles smaller than seven degrees with 1 ° inclination angle. The smaller beam angle your transducer has, the smaller the inclination angle can be.

Note

Ensure that you do not mount the transducer with a negative inclination angle. This may cause turbulence on the transducer face, and reduced ES38-7 performance.

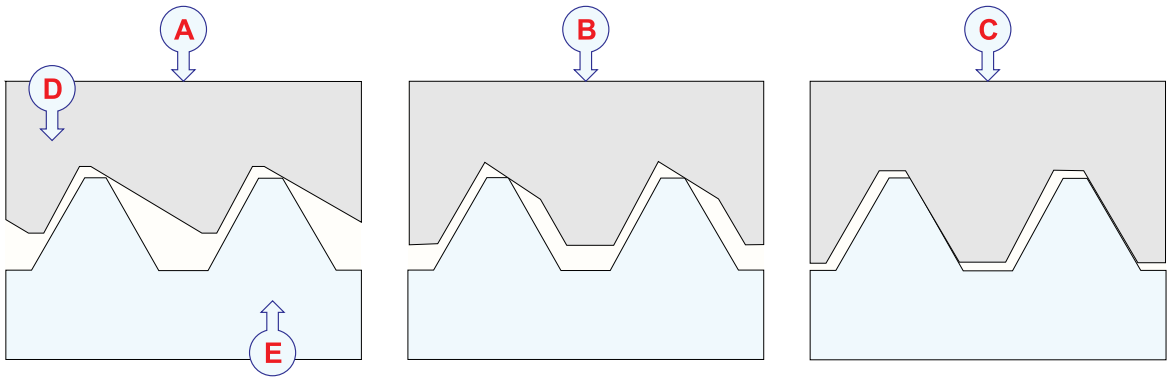
Related topics
Transducer installation principles, page 45

Using self-locking taps

The mounting rings delivered by Kongsberg Maritime are fitted with self-locking threads. Normal screws are designed to be loosened. It is however important to avoid accidental loosening, especially when the installation is subjected to dynamic stress. For this reason, additional locking devices are required. These are often expensive, they can only be used once, or react critically to temperature changes.

Introduction to Emuge self-locking threads

Emuge self-lock is a tap design with an integrated locking feature. Standard metric bolts are used. The internal thread provides a self-locking connection, which can be used repeatedly. It is not necessary to involve a secondary locking device (for example chemical, nylon or mechanical). The Emuge self-lock bolts withstand the vibrations better than standard (metric) threads, because the thread contact stops the sideway movement. The special design of the internal thread profile also provides a more even distribution of the tightening stress over the whole thread length. The assembly is just as easy as with a normal (metric) thread. There is no general applicable standard (e.g. DIN standard) for the **Emuge self-lock** thread.



A *Emuge's saw-tooth profile up to pitch P ≤ 0.7 mm*

B *Emuge's saw-tooth profile up to pitch P >0.7 mm*

C *Standard thread*

D *External thread*

E *Internal thread*

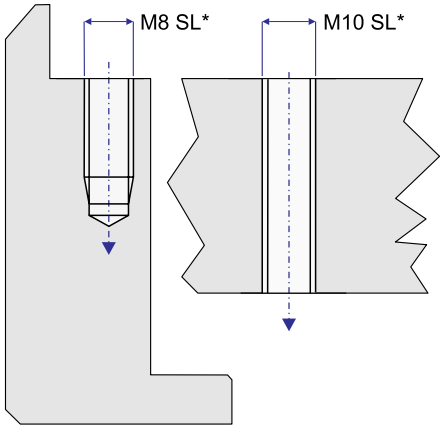
The advantages of using Emuge self-lock thread include:

- The thread locking feature if integrated in the internal thread

- Modified profile with ramp surface in the direction of stress
- 30° ramp surface provides self-locking effect
- Easy assembly
- No assembly errors (forgetting the locking device) possible
- Use the standard external threads (screws) with tolerance class "medium"
- Even distribution of stress over the whole tread length
- No stripping of threads
- Economically efficient locking system, no additional components are necessary
- Undiminished holding power even under dynamic stress
- Repeated loosening and re-tightening without loss of function
- Internal threads can be produced with Emuge taps, cold forming taps or thread milling cutters
- Larger thread hole diameters, i.e. increased tool life for threading tools
- Larger tolerance for thread hole diameters

Drawing standard

Whenever self-locking threads are required, this is shown on the technical drawing. In the case of tapping through holes, the arrow at the end of the center line illustrates the screw-in direction of the bolt.



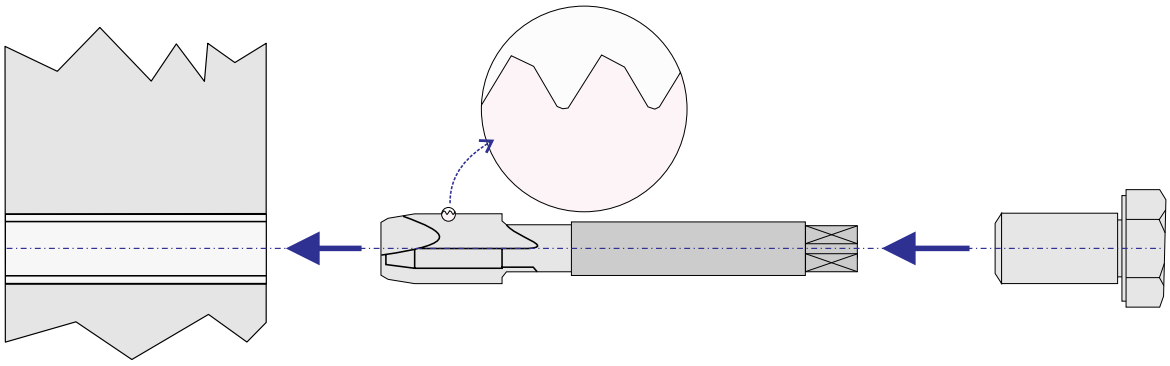
The drawing is normally provided with the following - or similar - text: *Drill diameters for threads differ from standard. Self-lock taps can be supplied by Kongsberg Maritime.*

Note

Refer to manufacturer's website for the latest drawings and information about the self-locking taps. The illustrations and information provided here is for reference only.

Taps

The pretension locking thread self-lock (taps) from manufacturer Emuge must be used.



Note

In case of tapping through holes it is important that the profile of the Emuge self-lock threads is in the correct direction compared with the entering direction of the bolt.

Gauge

Use Emuge self-lock gauges. Note that the gauge must be used in the correct direction.

Self-lock taps provided by Kongsberg Maritime

Several self-lock taps are on stock at Kongsberg Maritime, and can be ordered from us.

Threads	Drill diameter for threads	Part number
M6	ø5.2 mm	700–078838
M8	ø7.0 mm	700–078531
M10	ø8.8 mm	700–078408
M12	ø10.7 mm	700–078409
M16	ø14.5 mm	700–078410

Manufacturer

- **Manufacturer**: EMUGE-Werk Richard Glimpel
- **Manufacturer's address**: Nurnberger Strasse 96–100, D-90607 Lauf, Germany
- **Manufacturer's website**: http://www.emuge.de

Related topics

Mounting the transducer, page 33
Transducer installation principles, page 45

Where to install the transducer

Topics

Introduction to transducer location, page 65

Mount the transducer deep, page 65

Avoid protruding objects near the transducer, page 66

Mount the transducer at forward part of hull to minimize the effects from the flow boundary water layer, page 67

Keep the transducer far away from the propellers, page 68

Mount the transducer at a safe distance from bow thruster(s), page 68

Summary and general recommendations, page 70

Introduction to transducer location

A single answer to the question "where to install the transducer" cannot be given.

The physical location of the transducer depends on the vessel's design and construction, how the hull is shaped, and how the water runs along the hull. There are however a number of important guidelines, and some of these are even conflicting.

Note

The information here must be considered as general advice. Each ES38-7 installation must be handled separately depending on the hull design and the other electrical and mechanical systems installed on the vessel.

Related topics

Where to install the transducer, page 64

Mount the transducer deep

In order to achieve the best possible ES38-7 performance, mount the transducer as deep as possible under the vessel’s hull.

There are several reasons for this recommendation.

Flow noise

Consider the situations when the vessel is unloaded, and pitching in heavy seas. The vessel is riding high, and the bow may even be lifted out of the water. This will cause a lot of air to follow the shape of the hull.

The upper water layers of the sea contain a myriad of small air bubbles created by the breaking waves. In heavy seas the upper 5 to 10 metres may be filled with air, and the highest concentrations will be near the surface. Air bubbles absorb and reflect the sound energy, and they may in worst cases block the sound transmission altogether.

Cavitation

Cavitation is the formation of small air bubbles close to the transducer face. The bubbles appear because the local pressure becomes negative during parts of the acoustic pressure cycles. The cavitation threshold increases with the hydrostatic pressure. The noise is made when the bubbles implode.

Transmitting in air

The transducer must never be lifted free of the water surface. If the transducer is activated when out of the water it may be damaged beyond repair. Mounting the transducer at a deep position on the hull will in normally prevent this.

Slamming

Slamming happens if the vessel hull climbs out of the water in heavy seas. The force of the water when the hull falls down may push the transducer up, and may cause damage both to the transducer and to its mounting. This is especially important for low frequency transducers with large faces. The effect of slamming can be reduced by mounting the transducer as deep as possible on the hull.

Note

Kongsberg Maritime AS takes no responsibility for any damages to the transducer, the cable or the mounting arrangement, caused by slamming.

Related topics

Where to install the transducer, page 64

Avoid protruding objects near the transducer

Objects protruding from the hull will generate turbulence and flow noise. This will reduce the ES38-7 performance.

Protruding objects may be zinc anodes, transducers or even the vessel's keel. Holes and pipe outlets are also important noise sources, as well as rough surfaces caused by bad welding. Even traces of sealing compound, sharp edges, bolts or empty bolt holes will create noise. All these protruding objects may act as resonant cavities amplifying the flow noise at certain frequencies.

Do not place a transducer in the vicinity of protruding objects, and especially not close behind them. Make sure that the surface of the transducer face, the hull plating and putty around the transducer is as even and smooth as possible. Mounting screws or bolts must not be extruding from the transducer, the installation hardware or the hull plating. If necessary, grind and polish all surfaces.

Related topics

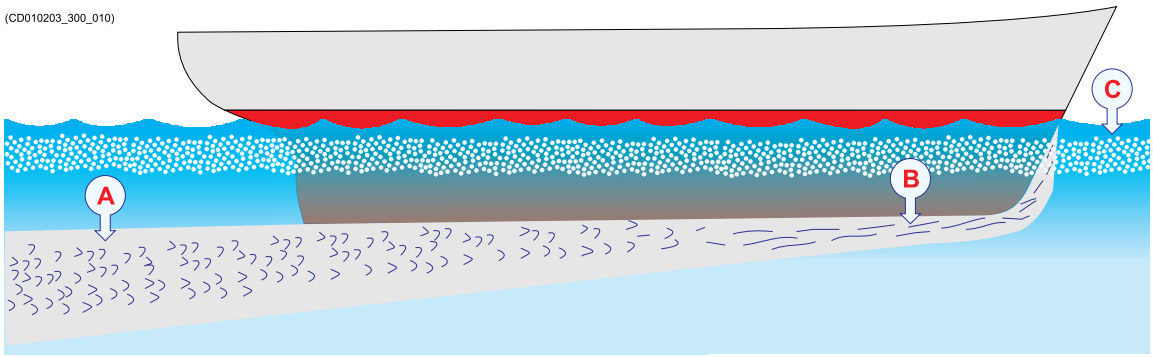
Where to install the transducer, page 64

Mount the transducer at forward part of hull to minimize the effects from the flow boundary water layer

The upper water layers of the sea contain a myriad of small air bubbles created by the breaking waves. When the hull moves through water it will cause a disturbance, and this will generate friction. The friction zone is called the *flow boundary layer*.

The flow in this boundary layer may be *laminar* or *turbulent*.

- The *laminar* flow is a nicely ordered, parallel movement of the water.
- The *turbulent* flow is a disorderly flow pattern, full of eddies.



A *Turbulent flow*

B *Laminar flow*

C *Air bubbles*

Air bubbles absorb and reflect the sound energy, and they may in worst cases block the sound transmission altogether.

The boundary layer increases in thickness when it becomes turbulent. The boundary layer is thin in the forward part of the vessel hull, and increases as it moves aft. The thickness depends on ships speed and on the roughness of the hull. All objects sticking out from the hull, or dents in the hull, will disturb the flow and will increase the thickness of the boundary layer. When the flow speed is high, the turbulence can be violent enough to destroy the integrity of the water. Small voids or cavities in the water will occur and this is called cavitation.

It is our experience that a wide and flat bottom, with a rising angle less than around 13 degrees, is prone to giving air problems for the transducer. In any case a transducer location in the forward part of the hull is preferred in order to minimise the influence of the boundary layer.

Related topics
Where to install the transducer, page 64

Keep the transducer far away from the propellers

The propulsion propellers is the dominant noise source on most vessels. The noise is easily transmitted through the water. This noise may often reduce the overall performance of your ES38-7.

The transducer must be installed as far away from the propellers as possible. The best positions are therefore on the fore part of the hull. Positions outside the direct line of sight from the propellers are best.

On small vessels we recommend mounting the transducer on that side of the keel where the propeller blades move *upwards*. This is because the propeller cavitation is weakest on that side. The cavitation starts when the water flows in the same direction as the propeller blades. This is where the propeller blades move downwards.

Related topics
Where to install the transducer, page 64

Mount the transducer at a safe distance from bow thruster(s)

Bow thruster propellers are extremely noisy. When you decide where to place the transducer, you must consider the noise created by most bow thrusters.

When in operation, the noise and cavitation bubbles created by the thruster may make your ES38-7 Split-beam transducer useless, almost no matter where the transducer is installed. When the bow thrusters are *not* in operation, the tunnel creates turbulence. If your vessel is pitching, the tunnel may be filled with air or aerated water in the upper position and release this in the lower position.

In general, the transducer should therefore be placed well away from the bow thruster(s).

However, this is not an invariable rule. Certain thruster designs - combined with their physical locations on the hull - may still offer a suitable location for the transducer, even close to the thruster. If you are in doubt, consult a naval architect.

Related topics

Where to install the transducer, page 64

Summary and general recommendations

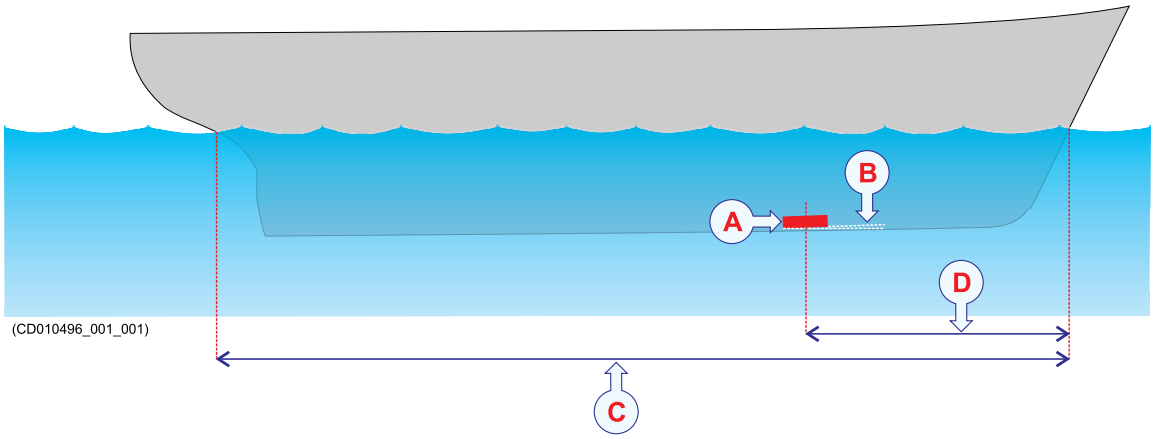
Some of the installation guidelines provided for transducer location may be conflicting. For this reason, each vessel must be treated individually in order to find the best compromise.

In general, the most important factor is to avoid air bubbles in front of the transducer face. For this reason, the recommended transducer location is normally in the fore part of the hull, well ahead of the noise created by the bow wave.

The maximum distance from the bow is normally equal to one third of the total water line length of the hull.

Note

Mounting the transducer more than 10–15 meters from the bow may cause problems with the turbulent flow.



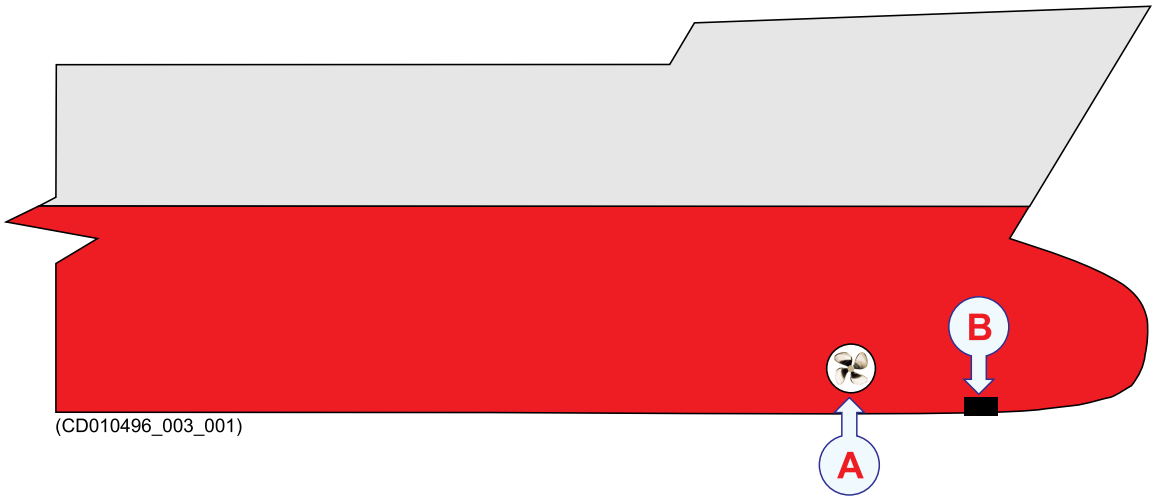
A *Transducer*

B *Inclination angle*

C *Hull length at water line*

D *Maximum 1/3 of the hull length at water line (C)*

If the vessel hull has a bulbous bow, this may well be a good transducer location, but also in this case the flow pattern of the aerated water must be taken into consideration. The foremost part of the bulb is often a good location.



A *Thruster*

B *Transducer location*

This applies to the vessel in normal trim and speed.

Important

The transducer must not have a negative inclination angle compared to water flow.

Do not place a transducer in the vicinity of protruding objects, and especially not close behind them.

Make sure that the surface of the resulting installation is as smooth and streamlined as possible.

Related topics

Where to install the transducer, page 64

Drawing file

Topics

About the drawings in the drawing file, page 73

393820 Dimensions ES38-7, page 74

074544 Mounting arrangement ES38-7, page 77

074076 Mounting ring ES38-7, page 80

About the drawings in the drawing file

Relevant drawings related to the installation and/or maintenance of the ES38-7 are provided for information purposes only.

Note

These drawings are provided only for information and planning purposes. Information may be omitted. Observe the source drawings for additional details.

The drawings are not to scale. Unless otherwise specified, all measurements are in millimetres. The original installation drawings are available in PDF and/or AutoCad's DWG format. The original drawings can be downloaded from our website.

https://www.simrad.com

Some drawings and documents are not available from our website. These can be downloaded from the *Simrad Dealer Club*.

https://www.simrad.com/sdc

The installation shipyard must provide all necessary design and installation drawings, as well as the relevant work standards and mounting procedures.

If required, all documents provided by the shipyard for the physical installation of the ES38-7 must be approved by the vessel's national registry and corresponding maritime authority and/or classification society. Such approval must be obtained before the installation can begin. The shipowner and shipyard doing the installation are responsible for obtaining and paying for such approval.

Related topics

Drawing file, page 72

393820 Dimensions ES38-7

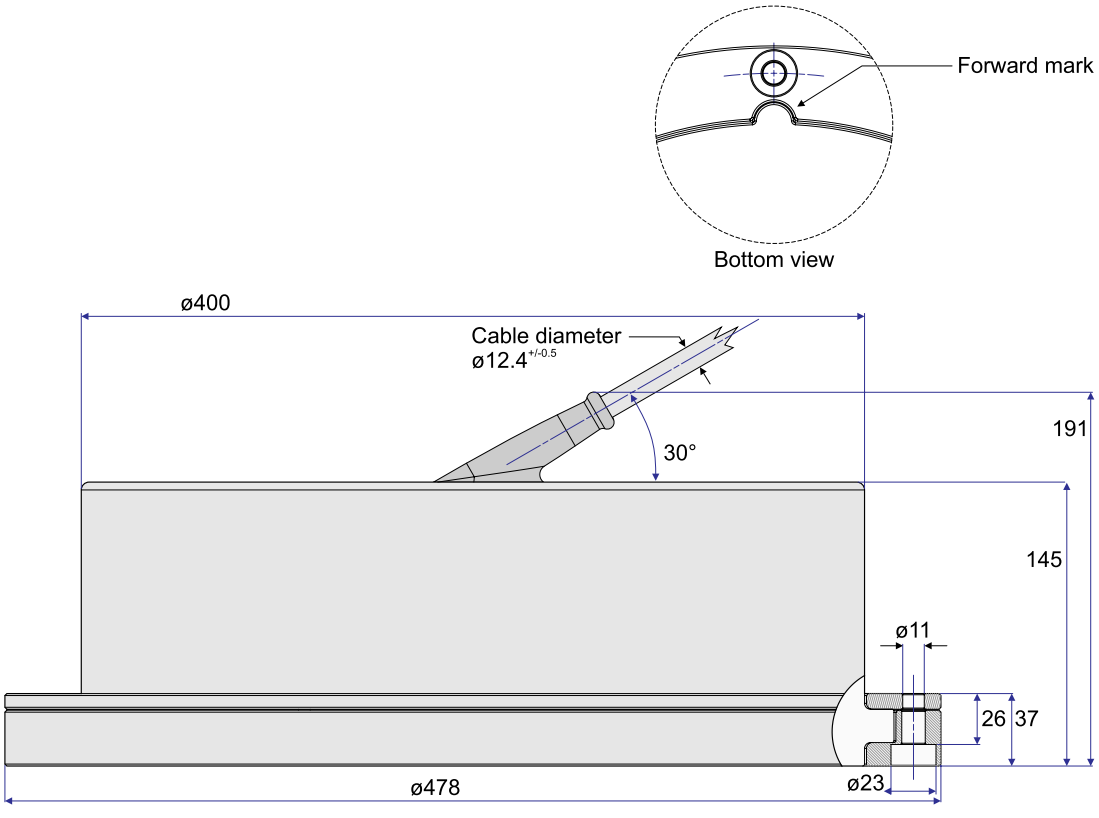
Download the source drawing from the transducer pages on https://www.simrad.com/td.

Part number: 386965

Weight of transducer: 65 kg
Weight of transducer in water: 45 kg
Weight including cable: 68 kg

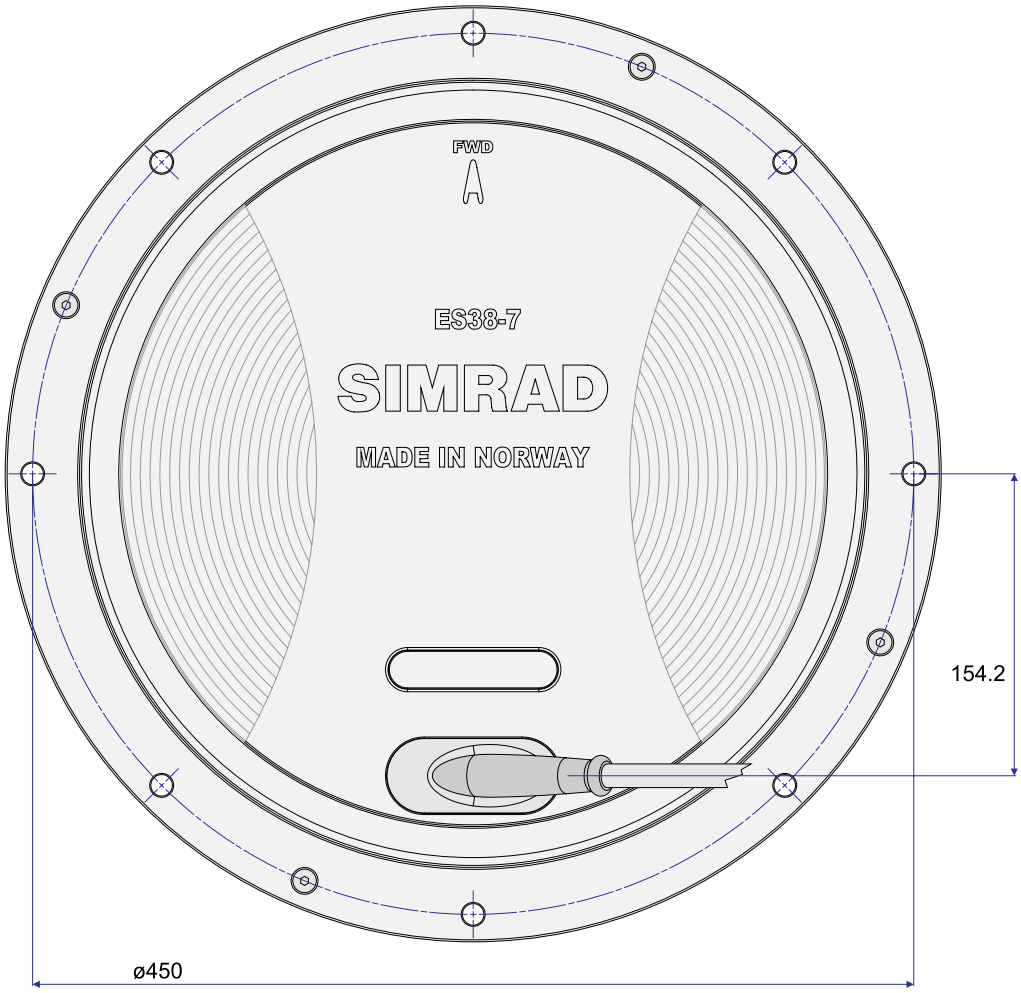
Standard cable length: 20 m
Conductors: 5 pairs
Bending radius static (theoretical): min. 100mm
Bending radius dynamic (theoretical): 185 mm

Installation screws: 8xM10
Nut for gasket: M32x2



All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[393820] Rev.A
CD12_393820_001_001



All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[393820] Rev.A
CD12_393820_002_001



All measurements in mm.
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Information may be omitted. Observe the source drawing for additional details.

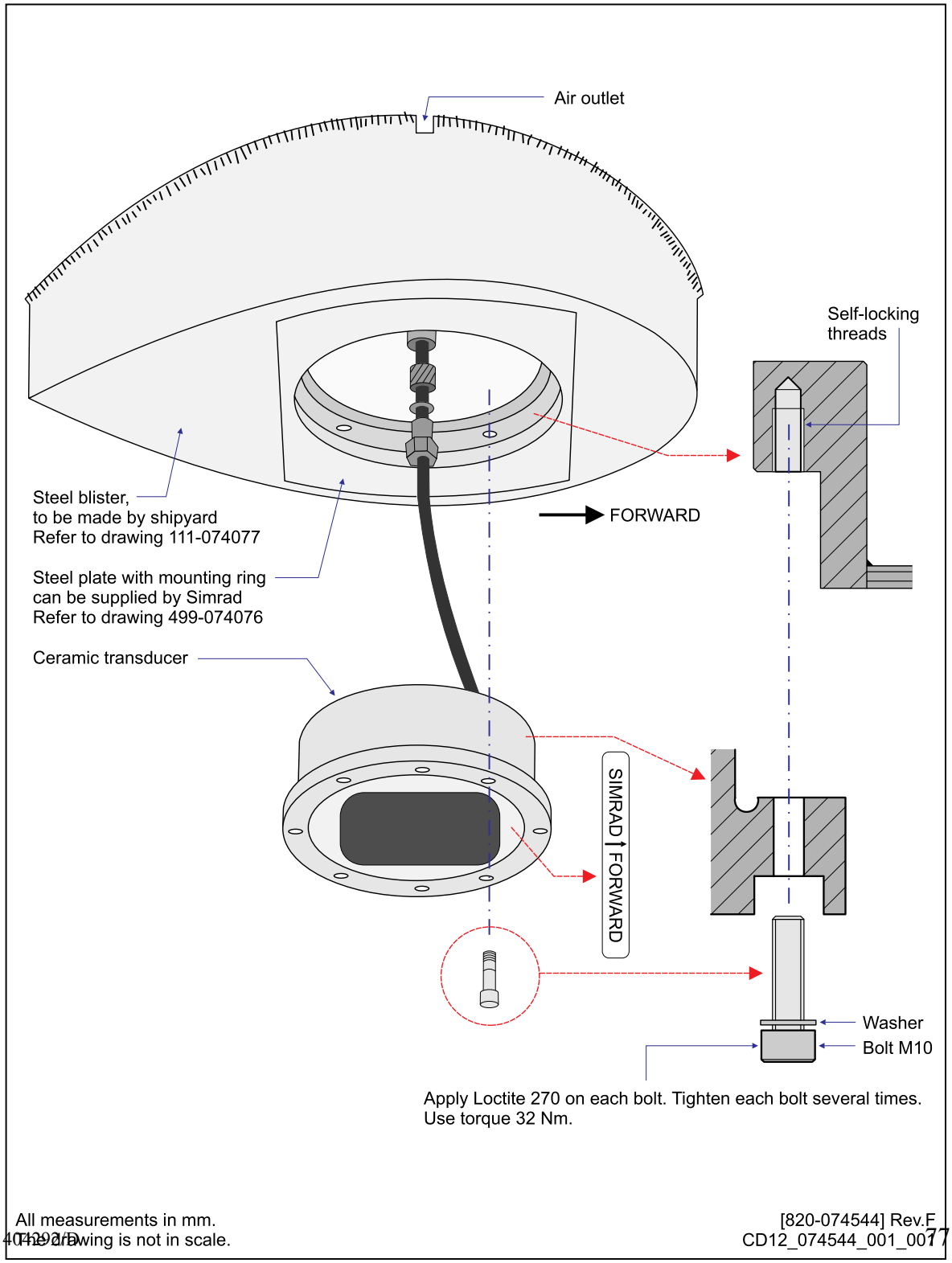
[393820] Rev.A
CD12_393820_003_001

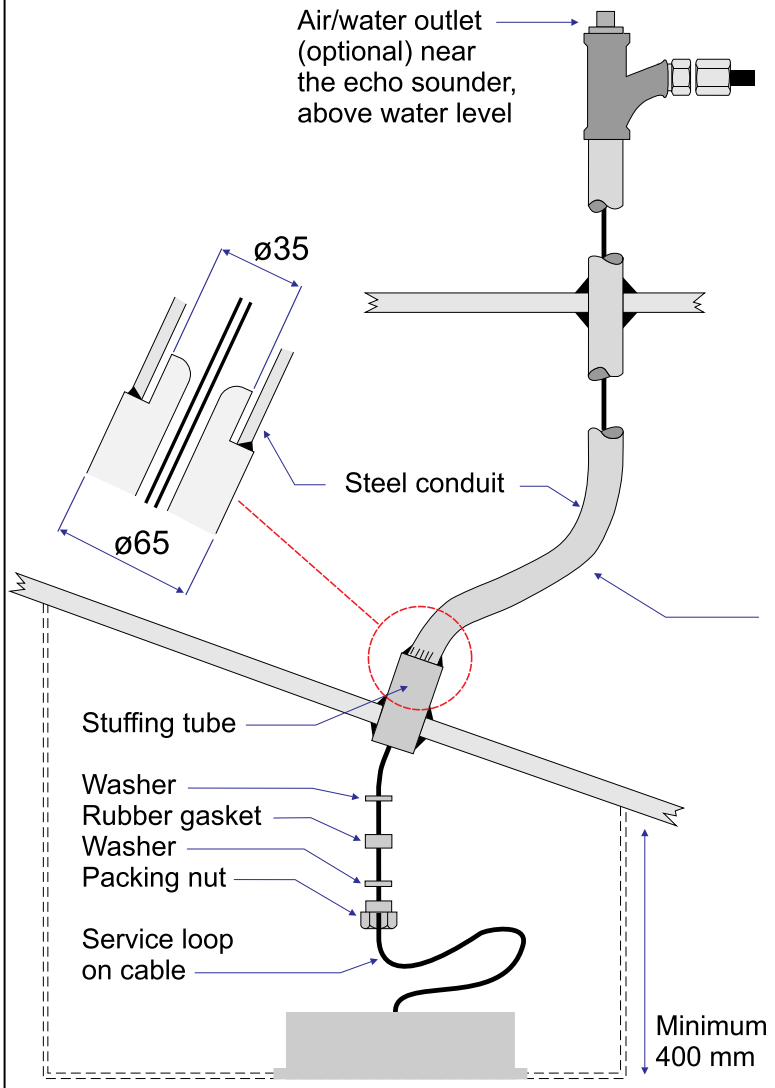
Related topics

Physical and environmental specifications, page 9
Drawing file, page 72

074544 Mounting arrangement ES38-7

Download the source drawing from the transducer pages on https://www.simrad.com/td.





Important:
In case of slamming in rough sea, use support beam 099-206575.

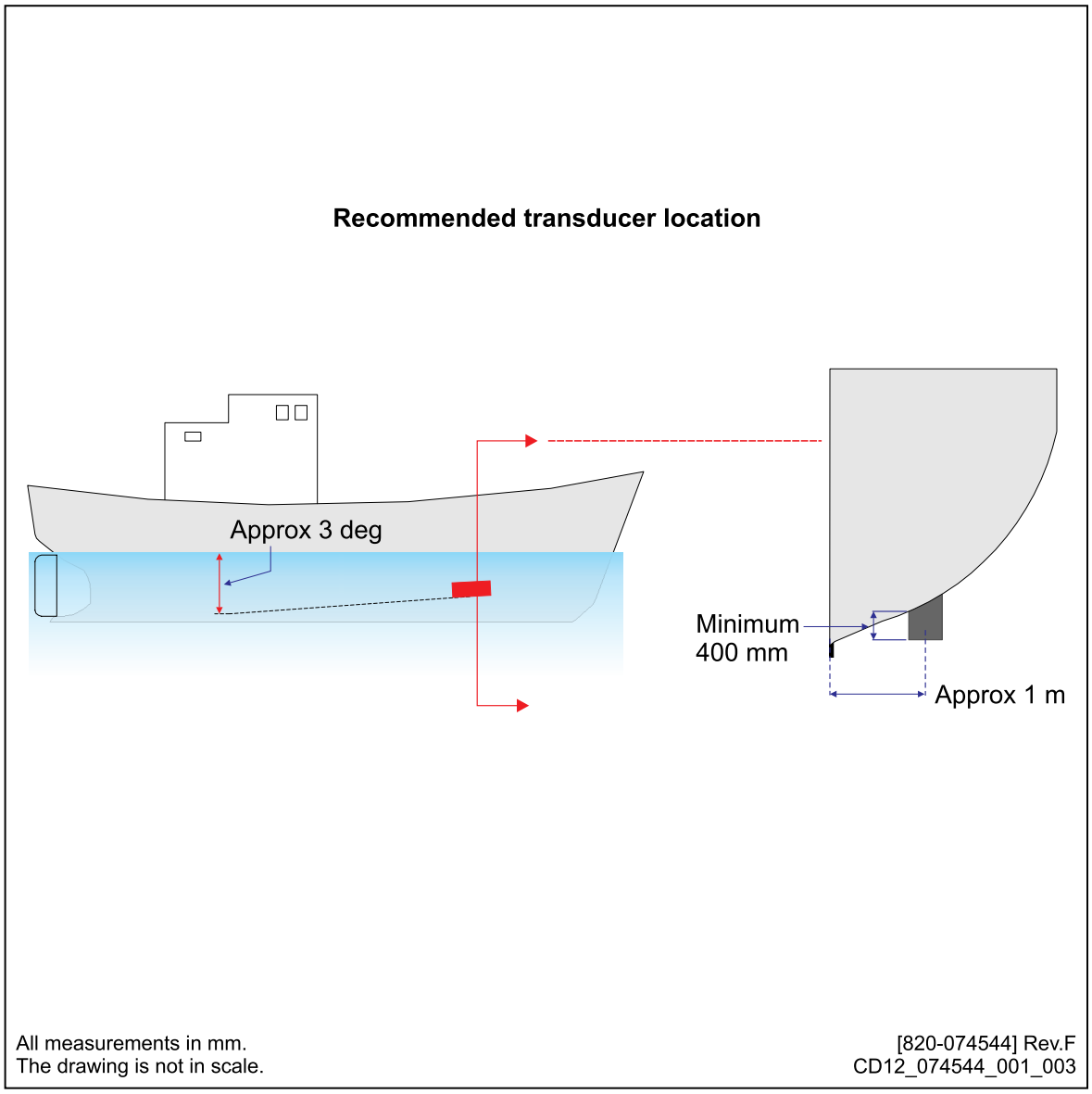
Anti-fouling paint:
The transducer face is made of polyurethane. In general, due to the risk of chemical reaction, it must not painted. If fouling is a problem, observe the recommended antifouling paints listed in the transducer installation manual and on www.simrad.com.

Steel conduit:
Recommended to minimize electrical interference.
Minimum inside diameter: 35 mm
Wall thickness: 6 mm (or 4.5 mm if galvanized conduit is used)

Lifting:
DO NOT lift the transducer by its cable.

All measurements in mm.
The drawing is not in scale.

[820-074544] Rev.F
CD12_074544_001_002

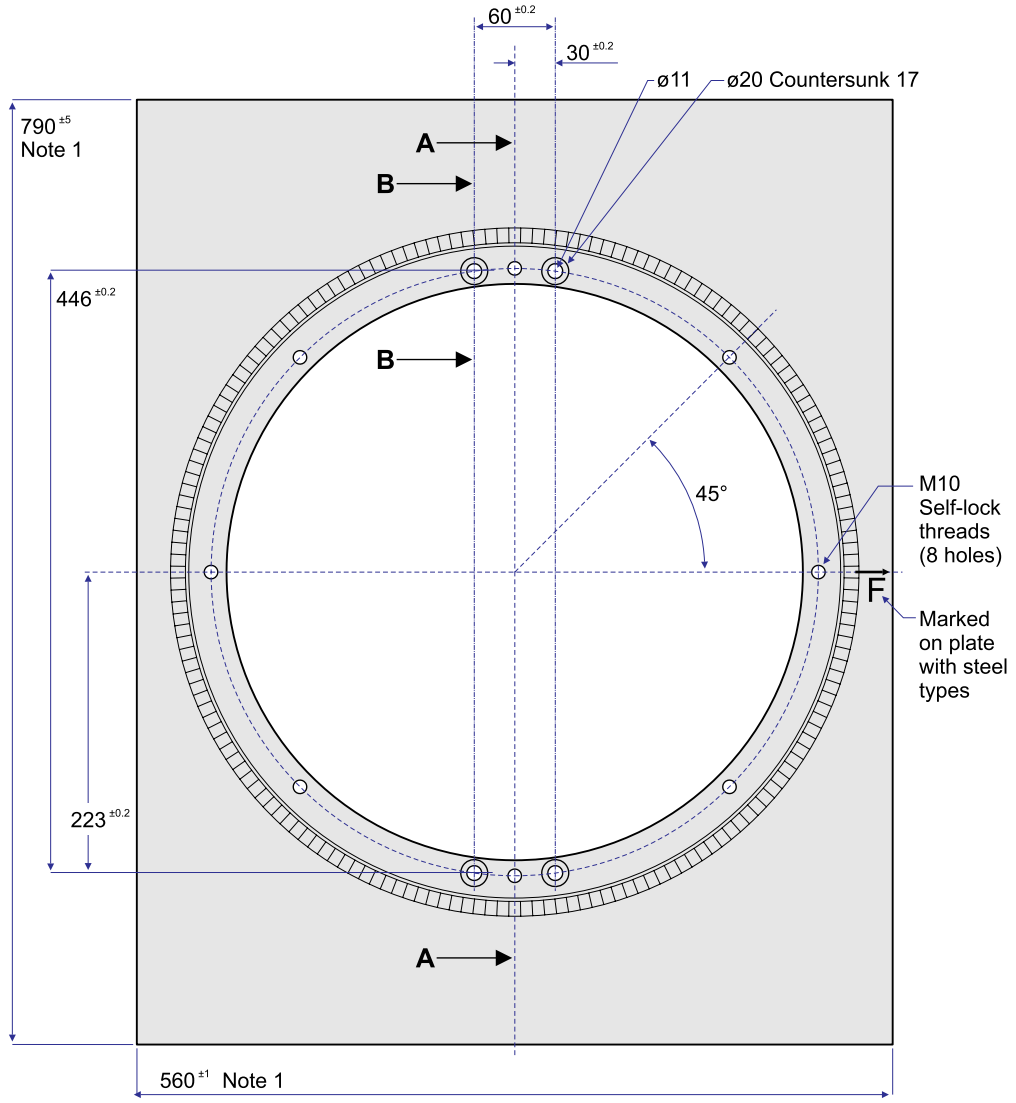


Related topics

Drawing file, page 72

074076 Mounting ring ES38-7

Download the source drawing from the transducer pages on https://www.simrad.com/td.

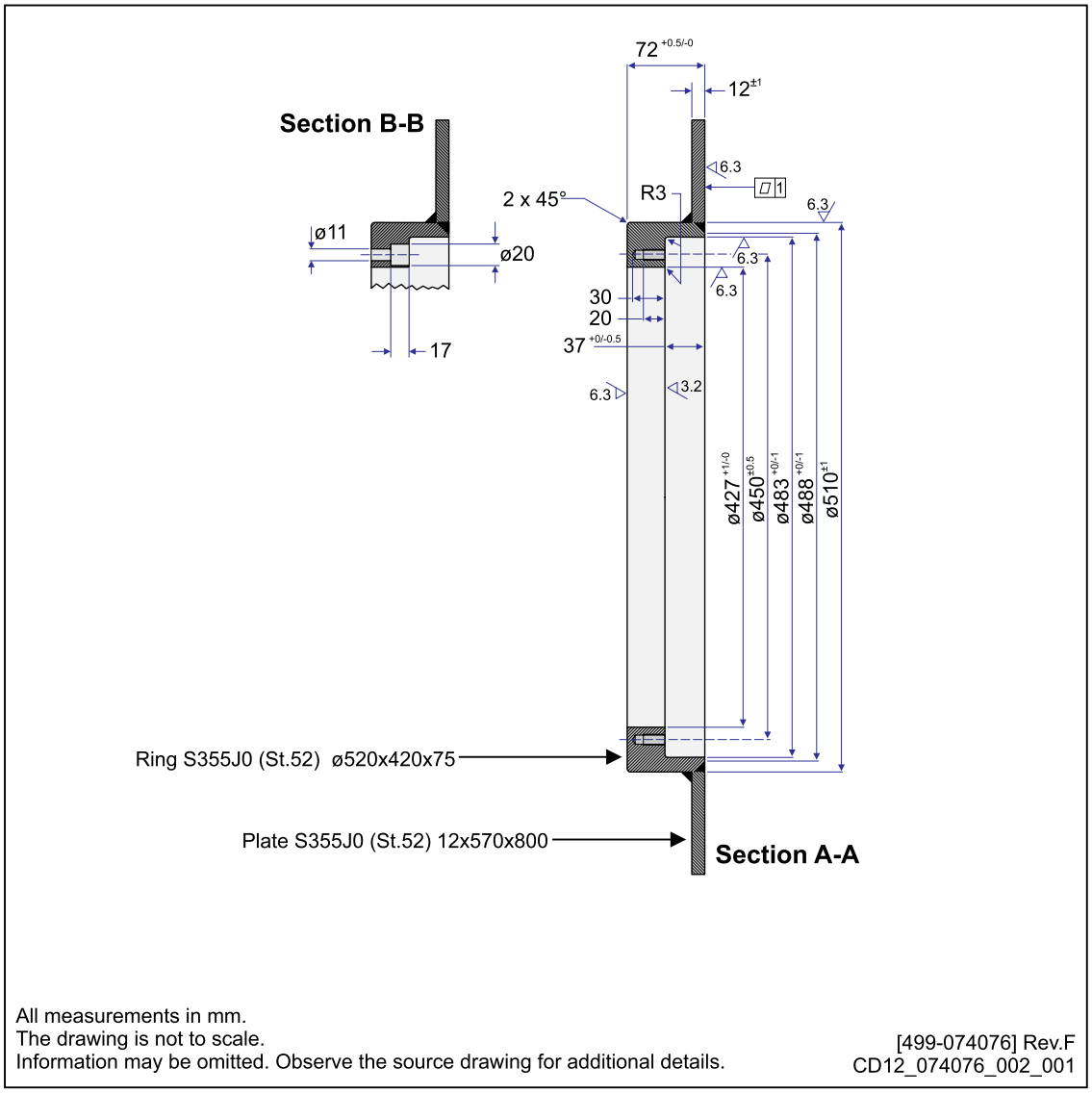


Note 1: For keel installation, size of plate should be adapted to keel design.

Surface treatment:
1) Sand blasted after grinding to SA.2.5
2) One coat of red ferric oxide primer

All measurements in mm.
The drawing is not to scale.
Information may be omitted. Observe the source drawing for additional details.

[499-074076] Rev.F
CD12_074076_001_001



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Installation Manual